GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXXIV., No. 3289] WEDNESDAY, JUNE 2, 1926. [78TH YEAR.

EDITORIAL NOTES.

Blind Obstinacy.

WE are now in the fifth week of the coal strike. On Monday night the time-limit expired which was applied by the Government to their offer of a further subvention of £3,000,000 for the relief of miners' wages in the more necessitous districts, if a settlement were arrived at before the end of the month. On the surface there has been no movement by either of the parties—no constructive suggestions—merely the same old obstinacy. What has been going on behind closed doors, we can pretty well guess. There somewhat unhappy conditions have prevailed; and there has no doubt been a secret hourly hope that some move would be made by the other party. Having expended and suffered so much as it has done, the country had better go on until a clean finish to this trouble has been secured. Nothing else will bring any durable peace. Obstinacy against viewing matters in their proper light is now on its trial; and only time can achieve what facts and reasoned argument have failed to accomplish. The leaders of the Miners' Federation are the chief sinners in this conflict of stubbornness. Millions of money have been lost to all engaged in the industry and outside it; and all that has been squandered from within the industry might have been devoted to that paramount essential—the improvement of its economic conditions. Instead, those conditions have been made immensely worse—for all in the industry and for the country. Upon the heads of the leaders of the Miners' Federation—through refusing to accept facts, and to do something to contribute to the revival of the industry—rests the present disaster, which will mean a crippled state for the industry for many a long day so far as the overseas markets are concerned. If the leaders possessed commonsense, they would see that the measure of harm they are inflicting even alone upon the miners is out of all harmony with any gain they could possibly secure, assuming their policy could achieve the end in view. Misery has spread among the families of the miners; starvation is standing close by. The Yorkshire miners appear to-day to be somewhat better off than their fellows farther north; to-morrow they may not be. The Somerset miners' funds are exhausted. Their last strike pay was at the rate of 8s. for full members, 4s. for half members, and 2s. for each child; and this pittance is from money received from the Miners' Federation. The Derbyshire miners have had their strike pay reduced from 15s. to 10s., with 2s. for each child, *plus* 1s., in the shape of a grant from the Miners' Federation. The funds which the Federation are distributing in this way are the monies received from miners' organizations abroad; but a few thousand pounds will not go far among a million workers and families.

Every opportunity has been given to the Federation to face the facts of the position of the industry, and to co-operate in improving the conditions to the benefit not only of the industry, but of the men—not so much in the immediate time, but the future. That is important. But they shut from their purview the realities and the future, and cling with fanatical unreasonableness to a phrase—"Not a penny off wages; not a second on hours." By their crass stupidity, they are creating a terrible position for those who are dependent upon them and their judgment; and the sooner the rank-and-file appreciate this, the better for themselves and those belonging to them. The country could not do more than it has done, through money, time, loss, and patience, in giving the Federation leaders an opportunity for doing something good for the industry and the men; and the Government were right in their attitude in issuing an ultimatum regarding a time-limit for further assistance from the pockets of the taxpayers. The end of it all will be just what might have been, and should have been, months ago—there will have to be mutual sacrifices. But the most important is an increase of hours, with a larger production per man-shift, and a better ratio between labour employed and output than has existed ever since the war. Some newspapers have been advocating, as the only way out of the present position, an increase of the hours to seven-and-a-half or eight, and have taken to themselves the credit of a great discovery. Although the "discovery" is one which was long since a determination of, and advocated by, other people who had made a close study of the coal position, the taking-up of the point by the newspapers is doing good, in that it is creating public opinion which even stubborn leaders cannot ignore. So long as the present attitude of the leaders persists, they will continue to be the biggest enemies the miners ever had.

While the leaders are persisting in this folly of refusing to come to an agreement by conceding the additional hour per shift, the visible coal supplies of the country are getting lower and lower. It has been considered necessary further to diminish purchasable fuel rations; many works in the country have had to close down or operate short time; unemployment is increasing day by day. Nevertheless, the position has to be faced; and men in power in any sphere must be shown that policy must be subject to circumstances, and circumstances in this case mean economic facts. Reports from many areas inform us that gas and electricity supplies are being well maintained, although here and there there are hints that, if relief does not soon come, expediency will claim restriction of supply. There is no question that the equanimity with which the public are regarding the coal situation is due largely to what the gas industry is able to do for them. Gas-works are again proving, as they have proved before, that they are a great reserve force in an emergency such as this. Perhaps this event will help to remove from the eyes of the Government the scales which prevent their seeing what is obvious to other people, that the gas industry is a vital necessity not only in the service but in the protection of the country, though, forsooth, the fact seems to require massive demonstration with a Government electrically hypnotized. However, we learn that coke is also in active demand, and is filling many a gap in industry where coal is wanting. Oil fuel likewise appears to be regaining some of its old wartime vigour for the service of boilers. Happy are those works depending upon electrical energy which have their own gas or oil-driven generating sets, and are independent of solid fuel and rationing regulations. However, the whole country hopes for a speedy delivery from the present affliction, but only on lines which will help to place the coal industry in a proper economic position, and will ensure a greater stability to peace. We have had enough clouded years through the policy of the Miners' Federation, and the obstinacy of the leaders against viewing affairs in a proper light.

Growth of the Institution's Work.

THE report of the Council of the Institution of Gas Engineers, which will be presented at the annual meeting (postponed to a date to be fixed), will, when studied, be found to disclose a good accumulation of strength—not only in the membership roll, but in scientific work and co-operative activity in many directions. The report itself is ample proof that the industry did the correct thing in separating, by organization, its political and commercial interests from the Institution, so as to permit of that body devoting itself, practically entirely, to technical and scientific pursuits. Every year new influences are bringing about changes in the organization, and in ways which are all to the good. In the membership of all classes, we see that there has been a net increase during the year of 27—making the total 1084. That is excellent; but the greatest change that is gradually coming about—this through the work of the Coal Gas and Fuel Department of the Leeds University, and of the other great central institutions, where education proceeds in matters fundamental to gas engineering and chemistry, also through the valuable operation of the Education Scheme of the Institution—is the permeation of the membership by a larger proportion of men who have been scientifically trained, and have at their finger ends the basic principles of professional and managerial duties. This, in itself, must cause a deep impression to be made upon the work of the Institution, raising it to a higher standard, and directing it to new research into matters which have hitherto been more or less neglected to our disadvantage in respect of maximum economy and efficiency, as well as industrial progress.

Glancing through the report, it will be observed in the first place that, in relation to their work, the National Gas Council utilize the Institution as their technical advisers, and to them refer investigation into questions upon which they require authoritative information from the technical point of view. This was pronounced in connection with the proceedings of the Royal Commission on the Coal Industry, as well as the research that had to be undertaken into the probable and possible influences of the Electricity Supply Bill. Now we have, through a request made to the Institution by the Council, a research being carried out with respect to the treatment of effluents from gas-works—a subject which is a pressing one, in view of the troubles which are being met, and which have been accentuated since the introduction of the more modern systems of carbonization. This co-ordination of work in the industry is of considerable value—more so than may be appreciated by the mere publication of the results of the combined efforts. Through the inspection of a problem from all points of view—political, technical, and commercial—and with concentration upon each, there cannot fail to be presentation of a case sound in all respects.

Dipping further into the report, we see how the Institution are able to carry the technical side of the work of our industry before kindred associations, and in this way spread knowledge which, in its effect, is also good propaganda for the commercial operations of the industry. The Institution, for example, are, through representation, keeping in close contact with the World Power Conference; and if there is development of the proposal of the Royal Commission on the Coal Industry, that a National Fuel and Power Committee should be established with advisory powers, the Institution must of necessity, in combination with the National Gas Council, take a good part in such development. Further, the report recalls that at the Public Works, Roads, and Transport Congress and Exhibition, the President of the Institution (Mr. Chas. F. Botley, M.Inst.C.E.) presided over one of the sessions, and valuable contributions were made on the occasion by Mr. C. S. Shapley and Mr. George Evetts. Also at another session of the same Congress, there was a paper by Mr. Thomas Glover and Mr. Arthur Collins on the "Use of Tar in the Construction of Roadways." At the Congress of the Royal Sanitary Institute in July of last year, Mr. John W. McLusky and Mr. James Campbell represented the Institution. In short, no opportunity on the technical side is lost by the Institution where there is a possibility, through representation, of doing something to advance the interests of the industry.

Direct investigation is demonstrated by the several avenues which Committees of the Institution are exploring, and of which many are supplied by the manifold processes of the industry. There is, for instance, the important work which is being done by the Wrought-Iron Tubing Committee; and the continued probing by the Refractory Materials Committee of the numerous problems associated with these indispensables in gas-works construction. There is the Gas Investigation Committee of the Institution and the Leeds University, who have produced results of valuable research for the industry over a long course of years; each year finding some addition made to our knowledge regarding matters which were more or less obscure through the lack of exploration. Among much else, we have had from the Committee the fruits of researches into the efficiency obtained from the combustion of different grades of gas in appliances commonly used; and this year it will be found that this has been supplemented by an examination of the nature of the products of combustion from such appliances—particularly of such products of incomplete combustion as carbon monoxide, when produced in quantities however small. Another field of work has been a complete and systematic examination of the influences which various factors exert in determining the results of carbonization—factors which in most cases are known to be operative, but surrounding which quantitative knowledge has not hitherto been forthcoming. In this year's report, it will be seen that the initial stage of this investigation has been to ascertain the effects of the size of coal upon carbonization. The research into the nature of the products of combustion from consuming appliances has been in the hands of Mr. James W. Wood, assisted by Mr. G. B. Howarth; and the one into the factors affecting carbonization has occupied the time and attention of Dr. Parker, with Mr. Kerr and Dr. Monkhouse as Assistants. Further, at the annual meeting (when held) there will be presented a report by the Research Fellow (Mr. C. B. Marson), in collaboration with Prof. Cobb. Mr. Marson has been making further inquiry into the influences of ash constituents of coal on its behaviour in carbonization and gasification, and has directed his work specially to the results of gasification in steam. Then we have the Corbet Woodall Scholarship, which has been held for the fourth year by Mr. A. G. Grant. His research, under supervision, has been into the behaviour of ordinary and special cokes in slow currents of steam. All this is a form of co-operative work. In other ways, the report shows further co-operation with such bodies as the Heat Engine and Boiler Trials Tabulation Committee of the Institution of Civil Engineers, and the National Illumination Committee of Great Britain, both of which bodies are doing work of inestimable value to our industry. The Institution have during the year been identified with other movements. They have been represented at the Conference of the Smoke Abatement League, and those on solid smokeless fuel, as arranged by the Society of Chemical Industry and the Chemical Engineering Group. There was also representation at the Antwerp Gas Exhibition.

In these and other ways, the Institution have been well to the fore in making contribution (apart from the proceedings at the annual meeting) to the advance of the industry's technical work, and to the distribution of knowledge concerning it.

Coke-Oven Gas Supplies during the Coal Strike.

FOR gas engineers a feature of the coal strike is the position of those gas undertakings which are dependent wholly or partially upon coke-oven plants for supplies of gas. They are in a special position; and readers of the "JOURNAL" will be interested to learn how they have fared, and are faring. We can supply information so far as Middlesbrough is concerned; and the experience is one which is unusually interesting, inasmuch as there is no other town of its size in this country which has been relying solely upon supply from coking plants. But the Engineer and Manager (Mr. Charles F. Blincoe) was prepared to meet the exigency; and we heartily congatulate him upon his success. When the strike commenced, the whole of the gas supply was being provided by a local coke-oven plant; and, for good reasons, the quantity of gas from this source commenced to be restricted on May 3, and ceased altogether on May 10. Due warning of this even-

tuality was received. The carburetted water-gas plant was brought into use immediately the shortage occurred; and by May 10 the plant was meeting about two-thirds of the requirements. By that time eight beds of inclined retorts, which had been heated up since April 28, entered into full gas-making action. Both plants recommenced service without any untoward incident, and are giving excellent gas-making results, notwithstanding that a large proportion of the retort-house men were wholly without previous gas-making experience. That is a particularly interesting point. The output is averaging nearly 2¼ million cubic feet per day; and a full and unrestricted supply of 450 B.Th.U. gas—consisting of one-third coal gas and two-thirds carburetted water gas—is being given. By making the gases in these proportions, the coal-gas plant provides just about sufficient coke to generate the quantity of carburetted water gas needed; and thus the coal stocks are being used to the best advantage. The whole of the staff has remained loyal, and the ungrudging service given by all has largely contributed to the successful way in which a difficult situation has been met.

Government Electrical Scheme and Competition.

THE first words of the paper which Mr. Harold E. Copp, M.Inst.C.E., read at the meeting of the North of England Gas Managers' Association last Friday were: "The gas "industry is indeed fortunate in that during the past thirty "years it has had to meet increased competition from the "electrical industry." There is not the slightest question that the competition has done much to stimulate wits, and so has been of inestimable advantage to both the gas industry and the community. We have no doubt, too, that the electricity industry wishes it had not stirred-up the gas rival to the extent it has done. At the same time, we are not prepared to accord to electricity anything more than a share of the credit for our accomplishments, because to do more than that would not be correct; and it would suggest that imagination, initiation, invention, and ambition were entirely dormant in the gas industry, until the electrical spur was applied, and aroused those qualities to activity. This we are not willing to concede. Though granting a certain measure of credit to electricity—and electricity can, if it is honest, return the compliment—there is strong opposition on the part of the gas industry to State-aided competition. But reading Mr. Copp's paper, which largely focuses the criticism that has been passed on the Government electricity scheme, there are two or three points which indicate that perhaps, after all, the State aid, in money, reorganization, and control, will resolve itself into State-aided degradation of the capacity of the electricity industry to meet as well as it is doing at the present time the competition from the gas industry. State-aided expansion of availability, there can be no question, will cause the present average efficiency of supply in existing statutory areas of the first order to be much reduced, and for a reason which is reflected by the argument set forth in Mr. Copp's paper. It is that electricity capital charges form a considerable proportion of the costs of supply; and no amount of concentration of electricity generation can produce economies to compensate for this proved fact—particularly as 50 to 60 p.ct. of the capital charges are on account of distribution, which is to be (according to plan) largely extended. Then, on top of this, there is the experiment by the Government in placing electricity production under a new hidebound order of control, instead of continuing to allow it the freedom of the exercise of individual energy in reducing generating costs, in which respect the electricity experts have shown themselves peculiarly adept.

Mr. Copp points out that up to the present no authentic figures have been forthcoming to show the cost of the supposed advantages—such as the capital sum that will be involved, the amount of new capital necessary to provide for output represented by obsolescent plants, the cost of losses to be expected from long-distance transmission of current, the losses due to transforming, and in many cases rectification. People might as well desire to obtain possession of the moon, as "authentic" figures regarding this invasion into the unknown, under political guidance and departmental direction and surveillance. "Authentic" figures will be obtainable after, and not before, the event. Only as development proceeds and the money is spent will exact costs be available; and as development proceeds, so will there be a mounting-up of capital outlay which for long to come must remain largely unproductive, or at any rate unprofitable. In the electricity industry there has been much grumbling in the past over the conditions under which it has had to operate, though considerable progress has been made. But, if it will give any satisfaction to our rivals, we sincerely condole with them in being made the victims of a piece of political interference far transcending anything which has previously happened, and in being led into a worse state of confusion.

Examination of the question by Mr. Copp shows that there is little chance of the average cost of electricity to consumers being reduced as a result of the Government scheme. That is a perfectly obvious and justified deduction, when it is considered that there is a limit to the size of a generating set at which economies can be derived, other circumstances being equal. Super-power stations are but a concentration of large-sized units; and, as from them extra economies per unit of output can only be of an attenuated order in comparison with present generating costs in large areas, the distribution costs and losses (the former in view of the capital charges and upkeep) must more than wipe them out, and probably add to the average costs of the whole supply. Another point upon which Mr. Copp comments is that, for the electricity industry, not the least disturbing feature of the Bill is the fact that it apparently contemplates the raising of long-period loans granted by the Government—even to the extent of sixty years for repayment. He points out that electrical machinery, cables, and other apparatus must become obsolescent in less than one-sixth of that period, with the result that the industry will be overloaded with dead capital, in addition to the capital which will become unproductive through the removal from the scene of their labours of what are regarded as uneconomical stations, in comparison with the super-ones which are to replace them. The "one-sixth" of the period, or ten years, is perhaps rather a restricted figure as an average of the life of electrical machinery and cables, seeing that the most vulnerable of electrical appliances are credited with a ten years' life. As a matter of fact, the sixty years is merely the maximum repayment period provided in the Bill. The clause says that repayment is to be "within such period not exceeding sixty years as the Electricity Commissioners may determine;" and we hardly think the Commissioners would adopt such a grotesque attitude as to allow the maximum period for the repayment of expenditure on all types of electrical plant, irrespective of life. In connection with this financial criticism, there is another point to which attention was drawn in the "JOURNAL" last week. It is that, as the capital required by the Central Electricity Board—viz., £33,500,000—for their part of the expenditure on the great adventure is to be guaranteed by the Government, this will only make the enormous unguaranteed capital needed by the electricity industry more difficult to raise on economical terms.

In the latter part of his paper, Mr. Copp presents another important matter. From what has already been said, there appears to be little chance of the scheme providing electricity at a cheaper rate than it is now supplied at in the large electricity-consuming areas; and yet, as the author points out, it must be supplied at a rate that is competitive with other agents. But he is not in favour of the gas industry resting upon, and being thankful for, the conclusions drawn from the consideration of obvious facts. Our business is—in our own interests, and in those of the community—to make the margin of advantage between ourselves and the competitors as wide as possible. Indeed, it would be a dereliction of duty if we did not do this. In this connection, however, one word of warning. It is absurd for us in the gas industry to pay any regard, as competitors, to the average efficiency of electricity generation in this country. The average is no criterion of actual achievable performance. The highest generating efficiency obtainable is the correct figure to take into account when comparing with our own high efficiency figures derived from modern working, because it is, after all, the main object of the Government scheme to replace the low average generating efficiency of (say) 11 p.ct. by weeding out the low-efficiency stations and generating at the high-efficiency ones, so raising that average. Mr. Copp does not ignore this point—in fact, he specially emphasizes it

in drawing attention to the efficiency of 21·7 p.ct. at the Barton station of the Manchester Corporation, and in referring to the new boiler efficiencies of 90 p.ct. or so about which we are now hearing, and to the fact that a new unit of 50,000 kw. of plant at a Chicago station is expected to give an overall efficiency of 30 p.ct. This is probably drawing a long-bow; anyway, it falls far short of the over-all efficiency of modern gas processes.

This brings us to the important lesson which Mr. Copp seeks to impress. It is that where efficient working is not being realized, there are the places of weakness in our industry. In such cases it is necessary that obsolete plant shall be scrapped, and new and efficient types be installed, not only in respect of production but of purification. Unless this is done, or the concerns amalgamate with, or purchase gas in bulk from, gas-producing undertakings which are working efficiently, the consumers in such districts will continue to pay the penalty of inefficiency, and probably the undertaking will also do so by making easier the path of the electrical competitor. In addition, Mr. Copp is strongly in favour of the best forms of public service in the industry. In this connection we heartily congratulate him upon the story told by the charts in the paper of fine annual increases of gas fire, radiator, boiler, and other connections, as well as of a considerable enlargement of the number of consumers, and of the quantity of gas sold per annum. Looking at the chart giving this information, it appears that since 1919 the number of consumers supplied by the Hull Station of the British Gas Light Company has risen from 49,725 to about 53,000 last year; and the consumption has ascended from a little over 1,400,000,000 c.ft. to approximately 2,000,000,000 c.ft. last year. When these figures are investigated, it is found that the average consumption per consumer during the past seven years has considerably enlarged.* At the beginning of the period, it was between 28,000 and 29,000 c.ft.; while last year it was between 37,000 and 38,000 c.ft.—an increase in average consumption per consumer of between 9000 and 10,000 c.ft. This is an excellent showing in the face of keen competition. It is in the increase of the average consumption per consumer that there is the most economical development of the gas business. Nevertheless, the inflow of new consumers must be continuous. To them a gas industry has to look for future expansion. Of this we are confident, that where a broad policy prevails such as is pursued by the British Gas Light Company, the Government electrical scheme, and all that its authors hope from it, will hold no terrors for the suppliers of gas.

Registration of Engineers.

Promoted by the Society of Technical Engineers, a Bill for the registration of engineers was introduced into the House of Commons on April 29, by Mr. Herbert Williams, M.P., supported by Sir Martin Conway, Rear-Admiral Sueter, Col. Crookshank, Mr. Reginald G. Clarry, and Mr. Pielou. A letter on the subject has been addressed to all the chief institutions in the different branches of the profession; and from it we learn that it is not proposed to proceed with the Bill before the fullest possible consultation has taken place with all the interests concerned. This is wise, as notwithstanding that the membership of the Society embraces engineers belonging to the several branches of engineering, it must not be forgotten that the Society are among the youngest organizations connected with the profession; but, of course, youth is no bar to valuable suggestion. As a matter of fact, in other countries professional protective bodies such as the Society have been the prime movers in advocating the registration of engineers, and securing its passage into law. The Society propose, in the first instance, to obtain an expression of opinion from the various organizations as to whether they are prepared to give general support to the principle of the measure; and then, if sufficiently supported, arrangements will be made for the discussion of details, so that the Bill will be open to any amendment to secure the widest possible agreement. In Italy, an Act was passed some three years ago providing for the registration of engineers and architects, and the titles of "engineer" and "architect" were thereby confined exclusively to those so registered. In the State of New York, an Act provides for the registration of engineers and land surveyors; and there it is unlawful for any person to practise in either profession unless duly licensed under the Act. The Royal Institute of British Architects, it is understood, are also preparing a Bill for the registration of architects. The Society wish to make it perfectly clear that, though they have initiated the measure, they desire to work in the closest alliance in the matter with other engineering Institutions; also that the Bill, apart from the principle, is more or less a scheme subject to modification as, in the general opinion, is desirable.

Thus there are two considerations: First, the principle of registration for engineers; and, secondly, if approved, the details. Regarding the principle, there are undoubtedly arguments in favour of registration. The field of engineering practice has been entered into by men who profess and call themselves engineers, but have no right whatever to the title. We see mechanics—fitters and plumbers, for example—who advertise themselves as engineers. But, on the other hand, we are not inclined to think that the Institution of Civil Engineers (who have been very zealous in guarding the title and professional distinction of their members) will be anxious to support this registration. We cannot imagine the eminent engineering men and firms whose work will go down in history agreeing with a statutory measure which will compel them to register, or disqualify them from practising as engineers, unless, at any rate, one member of the firm is registered. It is really humorous to contemplate registration in such cases; and indeed, to be candid, we incline to the belief that good would only come out of the scheme in relation to the installation strata of daily work in which gas, electrical, hot water, and other craftsmen delight in calling themselves "engineers," and nibble at the fringe of the engineering pastures, much to the annoyance of the lesser engineering lights. Ability, not registration or seals on plans and specifications, make reputations and build-up demand for a professional man's service.

Turning to the draft of the Bill, at the very beginning, we have cause to dissent from the proposals. Clause 1 provides for the establishment of a General Council of Engineering. In the composition of that body, it is contemplated that four persons, not being engineers, shall be appointed by the Privy Council—one each resident in England, Scotland, Wales and Northern Ireland; four persons, who shall be engineers, from the Royal Navy, the Royal Engineers, the Royal Air Force, and the Mercantile Marine; and sixteen persons, also engineers, appointed (four each) by the Councils of the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Naval Architects, and the Institution of Electrical Engineers. We fail to see why four members should be appointed by the Institution of Electrical Engineers, when the senior organization—the Institution of Gas Engineers—representing a branch of the engineering profession now in its twelfth decade, is not even named. Perhaps, however, the Institution of Gas Engineers may be allowed to come in under the next sub-section to the clause which provides that not more than six persons, who shall be engineers, are to be elected by the Statutory Council or Councils of such other Institutions, if any, as the General Council may determine ought to be represented. We shall be very much surprised if the Institution of Gas Engineers, should they determine to support the scheme, are satisfied unless they have representation on the General Council equal to that of the Institution of Electrical Engineers. It is noticed that an additional six persons, who shall be engineers, are to be elected by the Council of the Association of Technical Institutes; also six by the Deans of the Faculties of Engineering of the Universities of Great Britain and Northern Ireland, provided that, in the case of a University which has no Faculty of Engineering, the General Council shall determine how such University is to be represented in the election. Several other appointments are arranged for; and, in the end, we find that the General Council will be a bulky body, consisting of no less than fifty members.

Before noticing other points, it is observed that, by clause 6, the title of "engineer" is to belong exclusively to those persons who are registered under the Act (if it gets so far); and in clause 21 it is remarked that two years after the commencement of the Act, it shall not be lawful for any person or firm to describe his or their business as that of an engineer or engineers unless there is at least

one registered engineer actively engaged in the carrying on of the business. Any person or persons so doing, it is proposed, shall, on summary conviction, be liable to a fine not exceeding £50 for each offence. In view of the position and established character of the various branches of engineering in this country, the suggestion strikes us as being little short of an impertinence.

Regarding other matters, it is contemplated that one duty of the General Council shall be to fix the qualifications entitling persons to registration under the Act, and to keep and publish a register of such persons annually, which will contain information regarding their qualifications; also to take the necessary steps to prevent unregistered persons from using titles or descriptions calculated to give the impression that they are registered under the Act. In fixing the qualifications for registration, the General Council, in addition to setting the standard of examinations, are also to decide as far as possible the practical qualifications required. For engineers who are practising their profession at the time of the commencement of the Act, there is some consideration, seeing that it is contemplated that a member or associate member of any of the institutions represented on the General Council, or who at that date is a member or associate member of any other institution or professional association directly concerned with engineering, shall, provided application be made to the appropriate statutory council within two years after the commencement of the Act, be entitled to a certificate of registration without question as to other qualifications. That is thoughtful. A person who is not a member of any such association may, within two years of the commencement of the Act, produce to a statutory council satisfactory evidence—supported (this looks terrible) by a sworn declaration—that he has been engaged in engineering work in a responsible capacity for not less than five years, and is to be entitled, on his application being endorsed by three registered engineers, to registration. This shows that a man will have to go clean through the hoop before he can become registered, and continue to describe himself as an "engineer." The scheme also intends that members shall be in a position to pay a statutory fee of four guineas on application for registration, and an annual fee of four guineas. The institutions associated in this matter are to appoint during the third year after becoming represented on the General Council a statutory council to conduct the powers and duties under the Act; and this statutory council (who have their duties explained) are to transmit to the General Council the particulars of all members registered by them, together with (this is highly essential) 25 p.ct. of all statutory fees received by them. Rights of appeal to the General Council from decisions of the statutory councils are provided for; and in any case where the General Council on appeal from a statutory council refuse to grant a certificate of registration, or decide to suspend or cancel the certificate of a registered engineer, there is to be a right of appeal to the High Court. Many members of the engineering profession will be indebted to—perhaps, however, they will smile at—the framers of this scheme for their consideration.

There are a number of subsidiary clauses in the draft Bill, including one which provides for the preparation of seals of a design approved by the General Council, each of which is to bear an identification number or other mark corresponding to the identification number or mark of the engineer on the register. Another 20s. will be exacted for the seal. Then all plans, drawings, designs, tenders, estimates, certificates, and other like documents of an engineering order are to be stamped with the seal. "The use or issue of all such documents originating later than two years after the commencement of the Act without a seal or seals shall be prima facie evidence that they were not prepared by, or under the immediate supervision of, a registered engineer or engineers; and the persons, firm, or company using or issuing them in connection with the execution of any engineering work shall not be entitled to recover in any Court of Law any charge for such work." That is distinctly unkind; and it proposes to legalize fraud. For the wrongful use of seals, it is proposed that the guilty person shall, on summary conviction, be liable to a fine not exceeding £10 or imprisonment for not more than fourteen days. Some engineers in these days would find the latter penalty pay better than the former.

We should imagine that the fate of this measure (which savours of something rather despotic) is already sealed, unless there are drastic changes in it; and even then we firmly doubt whether there would be any unanimous acceptance by the great responsible engineering institutions of this country. The general attitude is likely to be hostile. Had such registration been desirable or called-for, we fancy the Institution of Civil Engineers would have moved in the matter long since. Work done and official status in engineering are greater attestations of ability than any amount of registration on the lines suggested in this Bill.

National Gas Council Report.

The Eighth Annual Report of the National Gas Council, which was presented at the annual meeting yesterday, is published in later columns. A full account of the proceedings at the meeting will be given in the "JOURNAL" next week.

Fellowship and Scholarship.

Among our small advertisements will be found two of which aspirants for positions in the gas industry should make note. They are issued by the Department of Coal and Fuel Industries of the Leeds University. By them applications are invited for the Research Fellowship and for the Corbet-Woodall Scholarship.

Peak Load Gas.

A contribution by Mr. G. M. Gill, on "A Possible Peak Load Gas" (which appears in later columns) cannot have its interest judged from the point of view of length. It is short, but full of suggestion. Mr. Gill points out how, through the tendencies of the development of gas consumption, the gas industry may find itself faced with demands for brief periods of the year of somewhat uncomfortable magnitude; and, looking forward, he defines the type of auxiliary plant which is required for this particular purpose. While he does not positively say that a plant he has inspected in America, which makes gas from fuel oil, would be suitable for the object in view, he believes that it is worth consideration "as a solution of a problem which is to-day engaging the attention of many thinking minds in England."

Benevolent Fund of the Institution.

The report of the Benevolent Fund Committee, which has been issued with the annual report of the Council of the Institution of Gas Engineers, records that there were only 423 subscribers during the past year, while the total membership roll of the Institution is 1096. This is not the healthy state of things the Committee would like to see obtaining in connection with such benevolent work as they are engaged upon—helping the needy, the work of whose husbands and fathers has been in the industry, and even, regrettable to say, old members of the Institution who are sometimes reduced to circumstances in which they have reluctantly to appeal to the Committee. In such work a distribution (including expenses) of £586 16s. 10d. in a year is not a large sum for an industry such as ours; and yet (excluding donations, which are in the nature of windfalls), the subscriptions and interest last year failed to meet the disbursements by £123 10s. 11d. We hope those members whose names do not appear on the list of subscribers will do what they can to rectify the omission. If the 673 non-subscribers contributed only 5s. a year each, it would swell the income of the fund by £168 5s.

Fruits of Ignorance.

The workers in the gas industry and all other industries which have suffered increased expenditure and loss of custom through the general strike will have good cause for resentment against the "T.U.C." for their autocratic action, as well as against the Miners' Federation for their attitude in preferring a strike, and prodigally wasting money, in the vain attempt to place their policy in a position superior to economic conditions, and in refusing to assist in producing a healthier state of things in their industry. Their action has made the country poorer, and has created more unemployment. Those industries which, like gas supply, have continued at work have had to meet increased costs, which are always detrimental to shareholders.

workers, and consumers alike. Gas workers will see they have nothing for which to thank the Miners' Federation or the "T.U.C." On the other hand, the community have much for which to thank gas workers, in respect of their loyalty through the great fiasco. Not all electricity stations came out so well; but there are now electrical men who were in good jobs before the "T.U.C." tried to manage the nation, and could not, and who are now walking the streets in search of new employment. They have only themselves to blame. At Fulham some electrical workers have, through their action, been arrested under the Emergency Regulations. There is the law of the land, which is higher than trade union law.

Low-Temperature Carbonization.

One of the curious things about share and stock dealers who extensively circularize the public regarding securities is that, in their printed information, they deal with matters (about which they can know very little) in a manner which gives to the layman the impression of an authoritative pronouncement. A circular has been sent to us which was issued by Messrs. Arthur Wheeler & Co., the well-known share and stock dealers, of Leicester. In it they treat of the general strike and the coal stoppage. In the last paragraph they state: "Hampered as we are by more difficult physical conditions, by the age of our pits, and by different social conditions, the hope of a recovery lies less in a bigger output than in a better use of the coal we are already getting. By low-temperature carbonization or some other process of making the best of our coal, and the elimination of the present wasteful methods, we see the way of escape. The present impasse so vitally affects the nation, that we should not permit our rather natural conservatism to prejudice our minds against fresh methods. If we dare make a prediction, we think the solution will be along these lines, and that before very long." Apparently our friends are of opinion that low-temperature carbonization is a better method of dealing with coal than the high-temperature process, and that therefore the latter is one of our "present wasteful methods," which ought to be eliminated. This, of course, depends upon circumstances, and what it is desired to obtain from the coal. Of course, whether coal be treated by low or high temperatures, the cost of the production of the coal itself plays an important part in the success of either system, and in our industrial rivalry with other countries—this despite what the Leicester firm says. Turning to another source of information, we find a scheme afoot for the reorganization of Low-Temperature Carbonisation, Ltd., and Gas and Fuel Plants, Ltd., and amalgamation with the Barnsley Smokeless Fuel Company, Ltd. Of the new Board of Directors, Sir Arthur Wheeler, Bart., D.L., J.P., of Leicester, has become the Chairman. Probably in this a reason can be found for the view expressed by the Leicester firm, that low-temperature carbonization provides a way of escape from our coal difficulties.

The Strike and Unemployment.

The official data regarding the number of unemployed persons recorded on the registers of Employment Exchanges in Great Britain on May 17 show a total of 1,612,700. This is 36,801 more than a week previously, and 427,680 more than a year ago. In addition to the 1,612,700, notices of claims to benefit had been given in respect of about 358,000 men not at work in the mining industry, and about 50,000 who had been on strike in other industries, and unable to resume work.

Lessons of the Strike.

One of the points made in an editorial article in the "JOURNAL" at the close of the general strike was that it had provided, for the country generally and for trade unions in particular, two lessons of outstanding importance. One was the great power of adaptability possessed by the nation on the withdrawal of trade union labour, and the other was that skilled men outside trade union membership provided a vast reserve of applicable power in the event of an emergency brought about by the brainless actions of trade union leaders. This is largely due to the growth of technical education and training, and to the fact that mechanical operation in industries has had such remarkable growth during the past two decades. Our friend "Meteor" of the "Electrical Times" has made much the same points in recent notes. But he examines them from the point of view of what might happen if some unexpected twist of the wheel of Fortune put a Labour Government in power, just when the members of the proposed Central Board under the Government electricity scheme were being appointed. He has no doubt whatever as to what would be the action of a Central Board so appointed in the case of an emergency. His view appears to be supported by what took place at Fulham during the general strike. A deputation endeavoured to dictate to the Borough Council as to which firms should have their supply of electrical energy cut-off. They were questioned as to who they thought should decide which firms should be dealt with in that way; and the reply was that the Trade Union Congress would have to be the final arbiters of this question. Thus at the time it seems there were some trade unionists who harboured the quixotic idea that their leaders were the real dictators of the country. Their minds have probably since been discharged of such nonsense. Upon the Fulham incident "Meteor" says that, in connection with the constitution of the Central Board under the electricity scheme, there should be a clear understanding of what are the safeguards. As he says, "It would be madness to leave any loophole whereby trade union leaders, however moderate and amiable they may be, sat in control of such a vital service as electricity supply." There is no question that, during the general strike, the Electrical Trade Union (who were trying to be very active and objectionable in connection with electricity supply) received a lesson which will not readily be forgotten by them. It is stated by our contemporary that again and again members of the "E.T.U." walked out of electricity stations; but in every case they were swiftly replaced. "Meteor" adds: "It is pathetic to think that the E.T.U.'s great moment in life has come and gone without incident."

PERSONAL.

Mr. JOSEPH DONALDSON, who has just retired from the staff of the Sheffield Gas Company, after 52½ years' service, was on Friday evening last, May 28, presented with a gold watch by his colleagues, as a mark of the esteem in which he has been held by all the members of the staff. Mr. Ralph Halkett (the General Manager and Secretary of the Company), in making the presentation, said that Mr. Donaldson had been a most loyal servant of the Company; and on behalf of himself and the members of the staff, he extended to him their very best wishes. He trusted that he would be spared for many years to enjoy the leisure he had so well earned. Mr. Halkett commented upon the remarkable growth of the undertaking during the long period Mr. Donaldson had been connected with it, and mentioned that when Mr. Donaldson joined the Company in 1873 there were only 35 members of the staff, whereas at the present time there were 220. He had served under three General Managers—Mr. Thomas Roberts, Mr. Hanbury Thomas, and Mr. Ralph Halkett. The number of consumers had increased from about 28,000 in 1873 to 124,000 in 1926; and the consumption had increased from about 1000 million c.ft. in 1873 to about 5000 million c.ft. at the present time. In returning thanks for the gift, Mr. Donaldson said he appreciated very much the kind things that had been said about him. He had always been treated with courtesy by the staff, from the chief officials downwards.

Mr. WILLIAM FIELDEN, Managing Director of the Salisbury Gas Company, has been elected a Director of the Wilts and Dorset Motor Services, Ltd., in place of the late Alderman F. Sutton, J.P.

Prof. A. G. PERKIN will, at the close of the present session, retire from the Chair of Colour Chemistry and Dyeing in the University of Leeds, after a connection with the University extending over 34 years. In view of this long service, and the valuable work which he has done, a Committee has been formed for the purpose of raising a fund which will enable the esteem in which Prof. Perkin is held to be signalized. Subscriptions should be forwarded to Prof. A. F. Barker, The University, Leeds.

Gas Used in Caning Chairs.—In caning chairs, a continuous, uniform, but small amount of steam is required for softening the glue by which the strips of cane are attached to each other. As they found no equipment on the market which exactly met their requirements, a chair manufacturing concern in New England appealed to the local gas company for assistance; and a scheme was worked out by which a gas-fired steam boiler equipped with automatic water feed and a low-water cut-off was designed to do the work. It is reported that this installation operates with great smoothness, and that the total gas consumption cost is only $1.50 a day.

A POSSIBLE PEAK LOAD GAS.

By G. M. GILL.

There is one direction in which the supply of gas is growing in difficulty year by year, and that is in the varying demand from day to day in the winter, and to a lesser extent during the other seasons. All this is to be attributed to the use of gas fires, and it exists in all countries, though in the United States it is central heating by gas which is having the same effect.

This load, acceptable though it is, is largely the cause of new plant being required; and no one will deny that it is a load which comes directly on top of the present peak load so far as manufacturing plant is concerned, and it cannot be long before it will have a similar effect on distributing plant. Mr. Tagg's estimate that it costs £30 of capital on plant for each 10-radiant gas fire installed is a sufficient indication that the development of the gas fire load must be seriously considered from all standpoints; otherwise it may lead to a gradual increase in the price of gas, or at any rate may prevent its decrease.

Some may comfort themselves with the reflection that the growing industrial load will counteract the effect of the gas fire load; but this cannot be, for the industrial load, extending as it does throughout the year, must be added to the manufacturing peak load, and therefore allowance must be made for its proportion of capital charges.

The distributing peak load, coming as it does in so many towns on Sundays at midday, is not affected by the industrial load, and to that extent the provision of capital charges on the industrial load can be decreased as compared with other classes of business. Further, the industrial load, like the cooking load, extends throughout the year, and so uses manufacturing plant to the best advantage; and some credit must be given for this favourable factor. Desirable though it may be, the industrial load will not solve the future effects of the gas fire load; and therefore some solution must be sought in another direction.

A flexible manufacturing plant like carburetted water gas, with its advantages but without its disadvantages, would be of great value to supplement coal gas plant at times of heavy demand. If the coal gas plant could be kept steadily at work with no variation other than being gradually increased in the autumn and decreased in the spring, and if all the peaks could be met by some type of plant which could be quickly put to work and as quickly dropped, there would be great advantage in its use. At the same time, such a plant, to serve the purpose in view, would require to fulfil the following conditions:

(1) Its capital cost must not be too high.
(2) Its stand-by costs must be low.
(3) Its labour requirements in operation must be small.
(4) The cost of making such gas must be reasonable; and, last but not least—
(5) The composition, density, and general characteristics of the gas must be very similar to coal gas.

This seems a stiff proposition; but when I was in the United States during the early part of this year I spent a day visiting a works where I saw a 4-million c.ft. plant making gas from fuel oil. Now this gas was similar to coal gas in all respects, and entirely fulfilled the conditions named above in respect of item 5, even in that of smell. In fact, I made the comment, "This is coal gas made from oil." The only raw material required to make this gas was fuel oil, of which about 7½ American gallons, or 6¼ English gallons, are required for 1000 c.ft. of gas of 550 B.Th.U. gross, which can be increased or decreased by varying the amount of oil used. A bye-product in the shape of lamp black is made; and this is sufficient to generate the considerable amount of steam which is required for gas-making. The gas is, in fact, made from oil and steam. While the quantity of oil required is large, it must be borne in mind that fuel oil is considerably cheaper than gas oil, and much more plentiful, while the range of fuel oil which can be used is very wide.

The class of plant employed is similar in character to a water gas unit; and it seemed to me that in the matter of capital cost and stand-by and labour charges it would be very similar. The cost of gas-making, depending largely, as it must do, on the cost of fuel oil, might, and probably would, seem large at first sight, though it is likely that the cost of alternative methods of providing peak load gas might actually prove considerably larger upon careful investigation.

I have not yet studied it closely enough to express any definite view, but it appealed to me at once as a possible solution to a problem which is to-day engaging the attention of many thinkers in England, the United States, France, and Germany.

ELECTRICITY SUPPLY MEMORANDA.

STANDING COMMITTEE C, over which Sir Robert Sanders presides, are, through the Parliamentary vacation, resting from their labours in the discussion and modification of the trouble-

Clause I.

some Electricity Bill. They have, as announced last week, got rid only of the first clause, which deals with the appointment and constitution of the Central Electricity Board. The principle of creating such a Board having been agreed to, there was little else in the clause to which exception could be taken; and so the discussion over it was largely confined to the provision of further safeguards. There will be more controversy when the Committee come to the duties of, and other matters affecting, the Board, though the Government have to some extent forestalled this by announcing their intention of making the Electricity Commissioners the technical advisers and designers, and the Board the determining authority. Why the Board could not, with the aid of technical advisers of their own, undertake the whole "job," without (having statutory authority) being in any way under the control of a sub-department of the Ministry of Transport, passes our comprehension. However, the Board will provide virgin ground for new appointments; and the electricity industry will have the satisfaction or otherwise of bearing the burden of the salaries, fees, allowances for expenses, pensions, gratuities, and other outlay incurred by the Board. When created, there will probably be many candidates for the offices. We referred last week to the modifications which the Committee had made in Clause 1. The first change was strongly pressed. It is that the Chairman and seven other members of the Board are to be appointed by the Minister of Transport, "after consultation with such representatives or bodies representative of the following interests as the Minister thinks fit—that is to say, local government, electricity, commerce, industry, transport, and labour." What a pity the words "as the Minister thinks fit" appear! It makes what should be obligatory simply permissive. All Ministers of Transport may not think fit. We have not specially in mind Col. Wilfrid Ashley; but no one knows who may be succeeding occupants of his office. Even Col. Ashley may not "think fit" to consult all the interests named; he may consult some, he may not consult any. It is left entirely to his discretion. Right and proper are the new provisions which prevent members of the Board being members of the "Commons House of Parliament," whole-time members from holding shares in any business supplying electricity or manufacturing or selling electric machinery or plant, and part-time ones from not divulging any such interests, and taking part in any deliberation or decision relating to a contract with a company in which they are concerned. There is a little doubt, however, as to what is going to happen in the future over this section of the clause: "A person appointed to be the chairman or to be a member of the Board shall hold office for such term not less than five years nor more than ten years as may be determined by the Minister before his appointment." Does this mean that members appointed now or in the future cannot hold office for more than ten years? The words "nor more than ten years" seem explicit; and there is no provision for re-appointment. If, as the section stands, it is not within the power of the Minister to reappoint the same men because they must not hold office more than ten years, it seems to us that—when they have become educated up to their work, and would be (or should be) more useful—they will have to go. There seems to be something wanting in the clause, as we cannot conceive that it is the intention to have a complete change in the personnel of the Board every ten years, or within that period.

Doubts, and a Kind Word.

About Dr. S. Parker-Smith's all-electric house a fair amount of information has been heard; and by some of it, the electricity industry has not been particularly struck. However, that is not the matter with which we wish to deal at the moment. It is that Prof. Smith can be broad-minded in regard to, as well as biased in favour of, the utilization of the energy to which his academical work is devoted. He has been delivering himself on the subject of the Government electricity scheme to the members of the Glasgow City Business Club. On the one hand, he showed that he is not partial to the scheme, and, on the other, he acknowledged that electricity has a strong competitor in gas, and that it is no use saying gas is no good, for people are "managing" very well with it. We could hardly expect him to say more; but so much is good when we remember his strong proclivity for things electrical. However, regarding the Government electricity scheme, Prof. Smith said he had been in conversations with electrical men throughout the country, and had not found many enthusiasts. Apparently he does not think that the scheme will do anything beneficial in the way of reducing to the consumers the cost of electrical energy in the already well-served industrial areas of the country; and while he admits that it is a fine idea to supply electric power at a cheap rate to districts which have no supply at present, he asks the per-

tinent question as to how far the Government are justified in sinking capital in furthering that end. He is inclined to the view that benefit might result from linking-up such undertakings as the Glasgow Corporation Electricity Department and the Clyde Valley Electrical Power Company; it would, for example, enable certain inter-working arrangements with regard to coal, staffing, &c. By the introduction of such economies, the cost of electricity would be automatically reduced. He is afraid, however, that, if the East of Scotland was linked-up with the West, the price of current would ascend rather than descend. He cannot see that any good for Glasgow would be achieved by supplying a number of outlying places. If the Bill, when it becomes law, only gives to the new Board permissive instead of compulsory powers, the prosperity hoped-for might be achieved. Further, he said that, while there was much talk of using electricity in Glasgow, it must be remembered that gas was there first. Prof. Smith urged remembrance of another fact—that where there are already cheap sources of fuel, such as coal and gas, the whole success of the electricity scheme will depend upon its being competitive. We are pleased to have this recognition from such an electrical authority of the important position that gas holds in the service of the community. We had become rather afraid that somehow or other the imposing fact had escaped him.

From Fixed Prices to Slot Meters.

The Electricity Committee of the St. Pancras Borough Council have found, like many other administrators of electricity undertakings, that fixed weekly charges, based on the number of lights installed in a dwelling-house without registration of consumption, is not a paying proposition. Six years ago they introduced a scheme of this kind, in which the charge was intended to cover the cost of wiring and to allow reasonable use of current for lighting purposes. Experience, however, has shown that consumers under the scheme have been using current extravagantly, which has prevented its showing a satisfactory financial result. In lieu of the system, the Committee are proposing to substitute payments through slot meters, calibrated to provide current at a charge to cover the cost of capital and maintenance for wiring, &c. After this cost has been realized, the remainder of the current consumed in a year will be charged at the rate applicable to ordinary consumers. The loans which have been raised are repayable in ten years; but it is assumed that the life of an installation will be considerably in excess of this, and therefore fifteen years is taken. On this basis, the slot meters are to be calibrated at 7d. per unit, to cover the cost of current and the other charges. The calculations which have been made will be interesting to those in competition with slot meters for electricity supply. Taking fifteen years for the capital charges (excepting the cost of meters), the figures work out as follows:

CAPITAL EXPENDITURE ON WIRING.

Capital expenditure for wiring to March 31, 1925 . . .	£6911
Capital expenditure for wiring year to February . . .	230
Expenditure for wiring provided out of revenue . . .	49
	£7190
Total points wired . . . 4194.	

CALCULATED ANNUAL CAPITAL CHARGES.

Allow the life of installation to be fifteen years—1-15th of cost of wiring	£479	
Interest at 4½ p.c. over fifteen years	173	
		£652
Repairs and maintenance of installation, one year .		292
Allow for contingencies in respect of alterations to wiring, &c., for fixing meters, £1000—Take 1-15th		67
		£1011 p.a.
		= 4s. 10d. per point per annum.

The slot meters are priced at £3 16s. each; and with the loan raised repayable in ten years at the present rate of interest (5¼ p.ct.), this would equal 9s. 10d. each per annum. A second table shows how the revised charges would operate upon this basis. It is as follows:

No. of Lights.	Revenue Required to Cover Wiring and Maintenance.	Revenue Required for Meter.	Total Revenue Required per Annum (Exclusive of Current).	Minimum Consumption of Units at 7d. each (Current 4d., Other Charges 3d.) before Operation of Rebate.
	£ s. d.	s. d.	£ s. d.	
1	0 4 10	9 10	0 14 8	60
2	0 9 8	9 10	0 19 6	80
3	0 14 6	9 10	1 4 4	100
4	0 19 4	9 10	1 9 2	120
5	1 4 2	9 10	1 14 0	135
6	1 9 0	9 10.	1 18 10	155
7	1 13 10	9 10	2 3 8	175
8	1 18 8	9 10	2 8 6	195
9	2 3 6	9 10	2 13 4	215
10	2 8 4	9 10	2 18 2	235
11	2 13 2	9 10	3 3 0	250

It is stated that it will be necessary to instal approximately 1000 slot meters at £3 16s. each, or a total cost of £3800. Other conditions of supply—such as the maintenance of the installation, and the renewal of lamps at a cost of 1s. each to the consumer—it is not proposed to vary, although there seems to be a little uncertainty in the minds of the Committee, as they protect themselves by saying that they are of opinion that the scheme should be reviewed from time to time.

Only 10 P.Ct. Electrified.

The National Electric Light Association of America have been meeting in Atlantic City; and, in the course of the proceedings, Mr. S. D. Heed, of Chicago, Chairman of the Sales Organization and Management Committee of the Association, asserted that, despite the growth of electric light and power, the homes and industries of the United States as a whole are only 10 p.ct. electrified. In the report it was also mentioned that, according to a recent survey, if the America of to-day were completely electrified with modern equipment, the total annual requirement of energy would probably be in excess of 500 billion KW.-H., as against approximately 65 billion KW.-H. in 1925.

Customer Shareholders.

At various times, in the columns of the "JOURNAL," there has been advocacy of the issue, as far as possible, of gas shares and stocks among local consumers. The ownership of such investments creates a new bond, in addition to that of good service, between consumers and gas-supply undertakings. In this connection, an interesting statement was made at the meeting of the National Electric Light Association of America, to which there is reference in the preceding paragraph. It was to the effect that more than 236,000 customers of electric light and power companies in the United States last year purchased securities of those companies. This increase in customer-owners brings the total up to 1,183,410, who have made available, for construction and expansion purposes, more than $1,000,000,000 of new capital. Since its inception in 1914, the customer-ownership idea has spread until 226 companies, 18 of which adopted the plan last year, are now selling securities directly to the public. These companies serve a population of 75,000,000. The report also mentions that the customer-ownership scheme has created a far-reaching change in the attitude of the public towards light and power companies. It has popularized the companies; and this, in turn, has rendered many activities less costly and difficult.

MINES DEPARTMENT ANNOUNCEMENT.

Coal (Emergency) Directions, 1926.

The Secretary for Mines wishes again to remind the public of the urgent necessity for economy in the use of coal. He wishes also to emphasize that economy in the consumption of gas and electricity is just as important as economy in the consumption of raw coal.

It is for this purpose that the Coal (Emergency) Directions have been issued under the Emergency Powers Act, and failure to observe them has been made punishable by heavy penalties. The most important of their provisions are as follows:

(*a*) HOUSEHOLD OR DOMESTIC CONSUMPTION.

Hitherto it has been possible for householders to acquire coal freely so long as they did not buy more than 1 cwt. of coal a week and had not more than 5 cwts. in stock. But on and after Friday, May 28, they will not be able to get any fresh supplies of coal at all unless they have a permit in writing issued by the local authority or their duly authorized officer. Nor can permits be given for more than 1 cwt. a fortnight, unless in exceptional circumstances, the nature of which must be stated on the permit. The only exception to this is that purchases not exceeding 28 lbs. a week may be made without permit, provided that the coal is taken away by the purchaser.

(*b*) INDUSTRIES AND BUSINESSES, INCLUDING FACTORIES, SHOPS, SCHOOLS, OFFICES, &c.

The weekly consumption of coal must in all cases be restricted to not more than half the normal consumption unless a special case has been made out to the satisfaction of the local authority, and written permission has been obtained from them. This applies also to the consumption of gas and electricity for power.

(*c*) LIGHTS FOR DISPLAY AND ADVERTISEMENTS.

These are absolutely prohibited. Only those lights may be maintained which in the opinion of the police are required for protection of property and public safely.

This notice is not intended to be an exhaustive summary of the Directions; and any consumers who are in doubt as to the effect of the Directions, should make a point of communicating with the appropriate local authority.

May 27, 1926.

NATIONAL GAS COUNCIL.

Eighth Annual Report, 1925-1926.

The following report, together with the statement of accounts, for the year ended March 31 last, was presented to the members at the annual general meeting yesterday.

GAS REGULATION ACT, 1920.

Section 1.—*Application for Orders.*—During the period under review, four gas undertakings have lodged application with the Board of Trade for the substitution of a standard or maximum price per therm in lieu of their existing price per 1000 c.ft., and four Orders have been made.

Section 1.—*Amending Orders.*—During the period under review, application has been made for a revision of the standard or maximum price per therm in respect of eight undertakings, and one such Amending Order has been made.

Section 10.—*Special Orders.*—During the same period, 49 gas undertakings have lodged application under this section, with a view to extending the powers conferred by their Private Acts, and obtaining additional powers.

Special Order Procedure.—(1) *House of Lords.*—The Select Committee of the House of Lords appointed by the present Government to consider the procedure in regard to Special Orders requiring an affirmative resolution by both Houses of Parliament reported in May, 1925. The report recommended, *inter alia,* that all such Orders should be referred to a Special Orders Committee, who should report whether a further inquiry is necessary before the Order is approved. The Council felt that this procedure was cumbrous and unnecessary, and would result in delay; and in conjunction with the representatives of the electricity and water industries, the Council lodged a protest with the appropriate Government Department. The recommendations of the Select Committee were, however, adopted by the House of Lords on July 14.

(2) *House of Commons.*—A Gas Special Order was recently sent to a Select Committee of the House of Commons at the instance of objectors who had failed to comply with the Statutory Rules and Regulations by appearing at the Board of Trade Inquiry. A protest was made to the Board of Trade against this procedure, which—if treated as a precedent—would defeat the intention of Parliament to provide a simple and expeditious method by which public utility undertakings might obtain, or extend their existing, statutory powers. The representatives of the Conjoint Conference of Electricity, Water, and Gas Industries also sent a resolution of protest to the Prime Minister and to the appropriate Government Departments.

ELECTRICITY (SUPPLY) BILL.

Prior to the introduction of this Bill, it was generally believed that the Government proposed to grant a subsidy to the electricity industry in connection with the development of a national scheme of electricity supply. The Council lost no opportunity of pointing out to Members of Parliament and to the public in general the unfairness of such a proposal. They made it clear that the gas industry was opposed to subsidies in any form whatever.

It is gratifying to note that the Bill as introduced into the House of Commons does not propose to give any subsidy such as had been foreshadowed. The Council has impressed upon Members of Parliament, both directly and through individual members of the Council, the imperative necessity for the provision of an independent, impartial tribunal to whom appeals can be made from any decision of the Central Electricity Board or of the Electricity Commissioners by any person affected thereby.

GAS LEGISLATION.

The facilities which the Electricity Bill affords to the electricity industry will render competition more severe; and with a view to placing the gas industry in a better position to meet such competition, the Council has for some time past lost no opportunity of urging upon the Government the necessity for modifying existing gas legislation.

RAILWAY COMPANIES' BILLS—PROTECTIVE CLAUSES IN FAVOUR OF GAS UNDERTAKINGS.

The Council has this year followed its usual practice of examining carefully the Bills promoted by railway companies, and notifying gas undertakings which appeared to be affected by the proposals contained in the Bills.

It will be remembered that a draft standard clause was prepared by the Council's Parliamentary Agents (Messrs. Dyson, Bell, & Co.) a year ago, for the protection of public utility undertakings, for insertion in Bills promoted by railway companies. Members of the Council have been advised of this clause, and recommended to adapt it to their own particular needs. This has been done with considerable success in the case of a gas undertaking which has agreed a clause for insertion in a Bill promoted by the Southern Railway.

RATING.

The Conjoint Conference of Public Utility Associations representing Gas, Water, Electricity, Tramways, and Light Railways has not only dealt with the important question of the rights of undertakers in connection with mains and cables in highways, but with other matters of interest to public utility undertakers in general.

During the passage through Parliament of the Rating and Valuation Bill of last December, an amendment was moved on behalf of the Conjoint Conference pressing for relief from rating in respect of the underground mains, cables, &c., of public utility undertakers. The Minister of Health promised that this claim should receive consideration on some other occasion; and an opportunity will doubtless present itself upon the introduction of a further Bill which, it is understood, will be introduced this year to deal, *inter alia,* with "special properties"—*i.e.,* railways, gas, electricity, and water undertakings in England and Wales—the proposal being that these should be dealt with by a Central Rating Authority.

The Rating (Scotland) Bill is also receiving the Council's attention, as affecting their Scottish members.

MAINS AND CABLES IN HIGHWAYS.

At the date of the last annual report, the Conference of Public Utility Associations, representing Gas, Water, Tramway, and Electrical Interests, had decided to confer with the Associations representing the Highway Authorities in Great Britain with regard to this question. A preliminary meeting under the Chairmanship of Sir Henry Maybury, held in May last, resulted in the formation of a Joint Committee representative of Public Utility Associations and Highway Authorities. This Committee has had several meetings. Great progress has been made in endeavours to agree a clause which will be acceptable to all parties concerned; and it is confidently expected that a clause will be definitely settled at an early date.

The negotiations of the Council's representative on the Joint Committee were considerably assisted by the successful appeal of the Northampton Gas Company in the House of Lords against the attempted insertion in their Special Order of an exceedingly onerous clause for the protection of the Northamptonshire County Council.

HOME OFFICE COMMITTEE ON THE LAW OF HIGHWAY DIVERSION.

In October last Mr. Ogilvie (Joint Manager of the Council) gave evidence before the Departmental Committee appointed by the Home Office to consider and report whether any amendment to the law relating to the stopping-up and diversion of highways was desirable, and, if so, to make recommendations as to how the law should be amended. In his evidence, Mr. Ogilvie pressed for full compensation by a highway authority in respect of any loss incurred by gas, electricity, tramway, or light railway undertakings by reason of an old highway being diverted or stopped-up; and, further, that where a new highway is constructed in substitution for the old highway, the costs and expenses incurred in laying new mains, cables, &c., should be paid for by the highway authority concerned. The Committee has not yet reported.

COAL COMMISSION.

In November last the President of the Council (Mr. D. Milne Watson) gave evidence on the Council's behalf before the Royal Commission appointed to inquire into the economic condition of the coal mining industry. The report of the Royal Commission, issued in March, 1926, bears witness to the national importance of the gas industry and to the part played by the National Gas Council in its organization. The Commissioners recommend, *inter alia,* the formation of a body called the National Fuel and Power Committee, to be composed of the Chairmen and other representatives of the proposed Coal Commissioners, the Electricity Commissioners, the National Gas Council, and other bodies concerned.

ROAD TAR PROPAGANDA.

Considerable progress has been made by the Committee appointed by the Council to promote the claims of home-produced tar for road construction and road surfacing. The Committee in question invited representatives of the National Association of Coke and Bye-Product Plant Owners (who are responsible for approximately one-half of the tar produced in this country) to join them; and this Joint Committee, under the title of the British Road Tar Association, is supported by subscriptions from gas undertakings and from members of the National Association of Coke and Bye-Product Plant Owners. Advertisements have appeared regularly in the journals devoted to road construction and road transport, advocating the claims of British tar.

A Joint Consultative Committee has been formed between county and borough surveyors and tar producers for the purpose of discussing questions arising in connection with the use of tar for road construction and maintenance. Many valuable suggestions have already resulted from these conferences.

The Council has every reason to be satisfied with the results accruing from the Road Tar Exhibit at the British Empire Exhibition, and from the stand occupied by the Association at the Public Works, Roads, and Transport Congress and Exhibition last autumn.

The draft Constitution for the British Road Tar Association has not yet been ratified by the parties concerned; but it is hoped that a properly constituted Association will be formed in the near future.

General.

Although so much of the Council's time has necessarily been occupied during the past few months in safeguarding the interests of the gas industry where these appeared to be threatened by the Government's proposals with regard to the electricity supply industry, other matters in connection with the gas industry have not been neglected; and every endeavour has been made to ensure a ready response where the advice and assistance of the Council has been sought by its members. Counsel's opinion has been taken on various questions affecting gas undertakings. The progress of any Bill through Parliament which, directly or indirectly, affected the gas industry has been carefully watched—*e.g.*, Public Health Bill, Roads Improvement Bill, and Smoke Abatement Bill—and the Council has had amendments to such Bills moved where these appeared called-for in the interests of gas undertakings. The proceedings of the Railway Rates Tribunal have been closely followed; and a Special Committee has been appointed by the Council to ensure that the claims of the gas industry for coal to be placed in the lowest class of railway traffic should receive due consideration. Evidence has been given on behalf of the Council before numerous Departmental Committees, including (besides those already mentioned in this report) the Committee appointed by the Board of Trade to inquire into British Trade and Industry.

A Committee has been appointed to consider the extremely difficult question of framing a scientific and equitable tariff of gas charges, and the advisability of basing the dividends of sliding-scale companies upon the average price received for gas. Mr. E. J. Fottrell (Joint Manager of the Council) paid a brief visit to the United States and Canada, for the purpose of obtaining information as to the position of the gas and electricity industries. Mr. Fottrell also studied the methods of charging for gas in operation in those countries, and his report is likely to prove most valuable.

Finance.

Income.—The total amount received by way of joint subscriptions to the National Gas Council, the British Commercial Gas Association, and the Institution of Gas Engineers (for research work) during the period under review amounted to £50,520, of which sum £17,680 is retainable for the purpose of the National Gas Council.

To the above figure of £17,680 there must be added interest on deposit account (£144) and payments by manufacturers in respect of sales of the Council's "Standard" gas cookers (£500), making a total of £18,324. Of the amount of £17,680, £4041 represents subscriptions paid in advance, and has therefore been carried forward to the financial year 1926-27. An amount of £1938 represents subscriptions paid in advance and brought forward from the last account, 1924-25. The income of the National Gas Council in respect of the year ending March 31, 1926, was therefore £16,221.

Expenditure.—The expenditure of the Council for the past year amounted to £17,835. The deficit on the year's working is therefore £1614, which increases the accumulated deficit at the date of the last account to £3842.

Reserve Fund.—Of the sum of £1066 shown in the last account, as the balance of the reserve for the purchase of furniture and fittings for the Council's offices at 28, Grosvenor Gardens, and for the expenses in connection with the acquisition of the premises in question, £66 has been expended for the purpose of additional office equipment, leaving a balance of £1000.

Membership.

The total number of undertakings subscribing to the funds of the Council at March 31, 1926, was 875, representing approximately 90 p.ct. of the total make of gas in the United Kingdom.

District Executive Boards.

The Council once again wishes to express its indebtedness to the District Executive Boards, Management Committees, Chairmen, and District Secretaries for the assistance which they have rendered during the period under review.

D. Milne Watson, *President.*
W. J. Smith, *Secretary.*

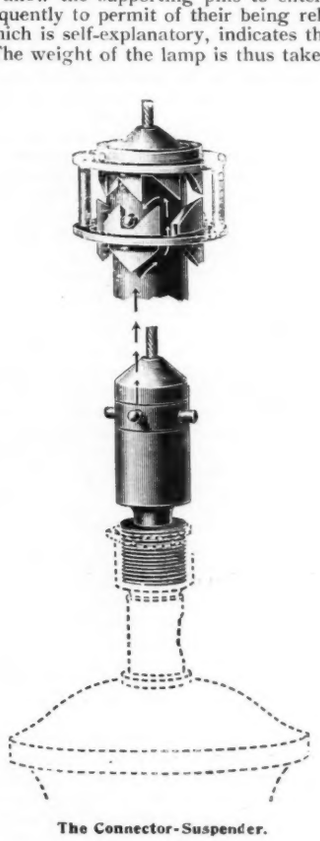
High-Temperature Measurement.—The issue of "Engineering" for May 28, in an article dealing with high-temperature measurements, states that, in order to obtain more reliable measurements of actual gas temperature, without exposing the couples to contamination by gases, soot, and dust, the Wärmestelle Düsseldorf of the Bereins Deutscher Eisenhüttenleute has developed an aspiration pyrometer, on the lines of the aspiration thermometer which the late Dr. Assmann introduced in the 'sixties, when it became evident that mercury thermometers carried by balloons did not show the correct temperature of the atmosphere. The appliance consists, briefly, of a sheathed thermocouple, mounted in a tube through which the gas, the temperature of which is to be determined, is drawn at a measurable rate.

LOWERING GEAR FOR GAS LAMPS.

Simple Automatic Device.

Though the lowering gear manufactured by the London Electric Firm, of Croydon, is in extensive use in London and other important places, it is thought that the merits of this system are not, perhaps, so widely known as they should be; and for this reason we propose to give a short description of this simple device.

The gear consists of a "one working part" automatic connector-suspender and a self-sustaining winch, and dispenses with flexible tubing and its many disadvantages. The connection between the lamp and the gas supply pipe is made between a cylinder and piston, and is such that a pressure of 300 in. (compressed air) will not affect it. The suspension consists of a ratchet, the lower half of which is cut away at every alternate notch—first to allow the supporting pins to enter and become trapped; subsequently to permit of their being released. [Our illustration, which is self-explanatory, indicates the working of the device.] The weight of the lamp is thus taken by the connector-suspender, and is only on the winding rope during the actual raising and lowering. No twist is given to the lamp, for, in addition to the pins forming part of a revolving collar, the ratchet itself revolves on its seat.



The Connector-Suspender.

To operate the gear, one has only to haul on the winch rope until the pins reach a dead stop at the top half of the ratchet; then a slight backward turn allows them to drop by gravity into the lower half, and become trapped. When it is desired to lower the lamp, a slight turn on the winch handle carries the pins up the inclined face of the next ratchet, where they reach the free outlet. Smoothness characterizes the working of the gear, this being due to the braking action of the piston in its cylinder, which eliminates jarring. No manœuvring or marking of ropes is necessary.

The winch contains a new mechanical movement by which rotary motion is obtained from cam grooves, and a positive self-sustaining feature is secured by robust parts, without recourse to pawls, triggers, springs, or similar devices. The weight is held in any position during raising or lowering.

Both connector-suspender and winch, though substantial in construction, are small, and can therefore be adapted to existing lamps. The former only alters the position of the lamp by a few inches, and the other can be fixed inside or outside any ordinary lamp pillar. Both devices, moreover, are weather-proof; and in the case of street suspensions any condensation forming in the supply pipes is automatically discharged by the gear. They are made applicable for all ordinary suspensions (such as ceilings, swan neck or rectangular arm brackets, harp-shaped pillars, &c.); for wire rope street suspensions; for fixing to irregular roof members; for arches over gateways, &c.

NEW GAS PLANT AT RETFORD.

History of the Undertaking.

In connection with the inauguration of new plant and an official inspection of the works of the Borough of East Retford Gas Department—the Engineer and Manager of which is Mr. J. R. Bradshaw, B.Sc. (Eng.)—a brochure was prepared, from which the following information and illustrations have been taken.

HISTORY OF GAS IN RETFORD.

It is nearly a century since gas was first supplied in Retford. The gas-works were built by Mr. James Malam; and the town was first lighted by gas on Dec. 22, 1831. Gas is still made on the original site, adjoining Grove Street. As far as can be ascertained, Mr. James Malam ran the undertaking as a private venture until the year 1836, when a Company known as the Retford Gas and Coke Company was formed to purchase the existing Albion Gas-Works. A glance through the names of the first Directors shows that Mr. T. Hercy Denman is the only direct descendant remaining of the original founders. The works were purchased by the Corporation in 1879 for the sum of £24,000; and the wisdom of the Corporation of that day in so doing is now proved. The present modern equipment is mainly the product of municipal enterprise.

In spite of the age of the undertaking, the last decade has seen an extraordinary development in the demand for gas; the annual productions since 1914 having been as follows:

Year ended	C.Ft.
Dec. 31, 1914	93,211,000
,, 1915	91,609,000
,, 1916	82,276,000
,, 1917	79,615,000
March 31, 1919	79,126,000
,, 1920	83,814,000
,, 1921	90,384,000
,, 1922	100,111,000
,, 1923	98,682,000
,, 1924	110,812,000
,, 1925	125,032,000
,, 1926	135,671,000

To cope with the ever-increasing demand, the undertaking has had a strenuous time in enlarging and modernizing its equipment in every department. The Corporation are still engaged on the provision of adequate mains and service pipes—work which has been proceeding steadily, with a fixed purpose, and at great expense, since 1919.

On the manufacturing side, all the original plant has been outgrown in the last eight years, and the new equipment comprises:

1.—Retort house and coal stores.
2.—Retort bench and equipment of the most modern type.
3.—Electrically-driven coal breaking and conveying plant.
4.—Electrical retort charger and discharger.
5.—Gas-engine driven electric generating set.
6.—Tower scrubbers, with modern filling material.
7.—Exhauster set.
8.—Purifiers.
9.—Station meter.
10.—New lift to existing spiral gasholder.

Items 6, 7, and 9 are in course of construction, and will be completed this year. The new plant was contracted for by the following firms.

Retort house, coal stores, retort bench, coke plant, and foundations: Messrs. ROBERT DEMPSTER & SONS, LTD., of Elland.

Coal handling plant and De Brouwer stoker: Messrs. W. J. JENKINS & CO., LTD., of Retford.

Generating set, comprising gas engine by Messrs. Ruston & Hornsby, Ltd., coupled to dynamo by the Electric Construction Company: Messrs. ROPER & WEEKS, LTD., of Sheffield.

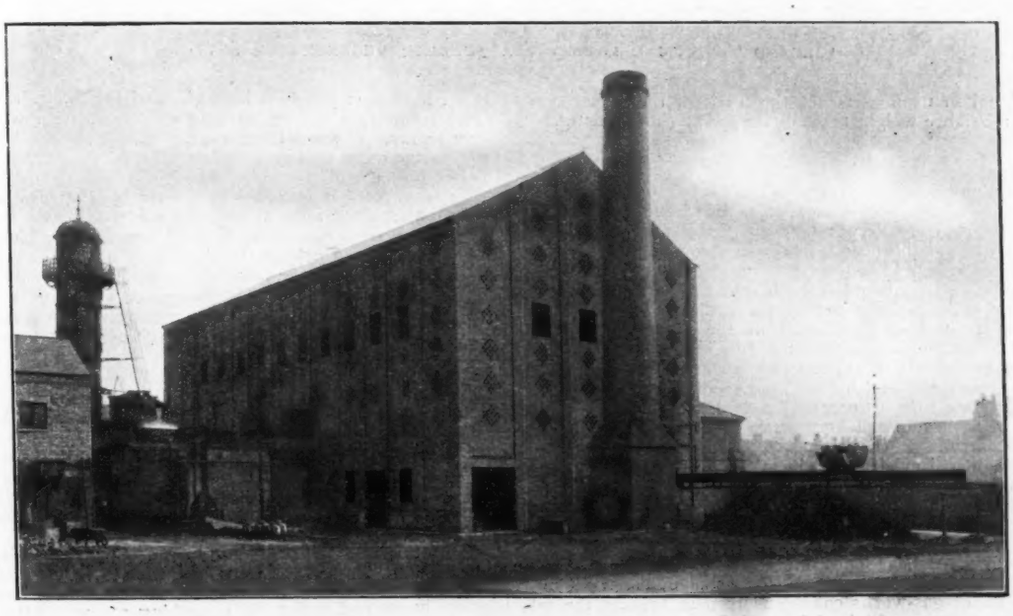
Chimney: Messrs. H. LISTER & SONS, of Sheffield.

MODERNIZED HORIZONTAL RETORTING—ROBERT DEMPSTER & SONS, LTD.

Cheap gas and efficiency of carbonization are, to a large extent, synonymous terms in the gas industry. Therefore, an epitome of detailed improvements incorporated in this modern installation to enhance the over-all efficiency of carbonization will be of general interest.

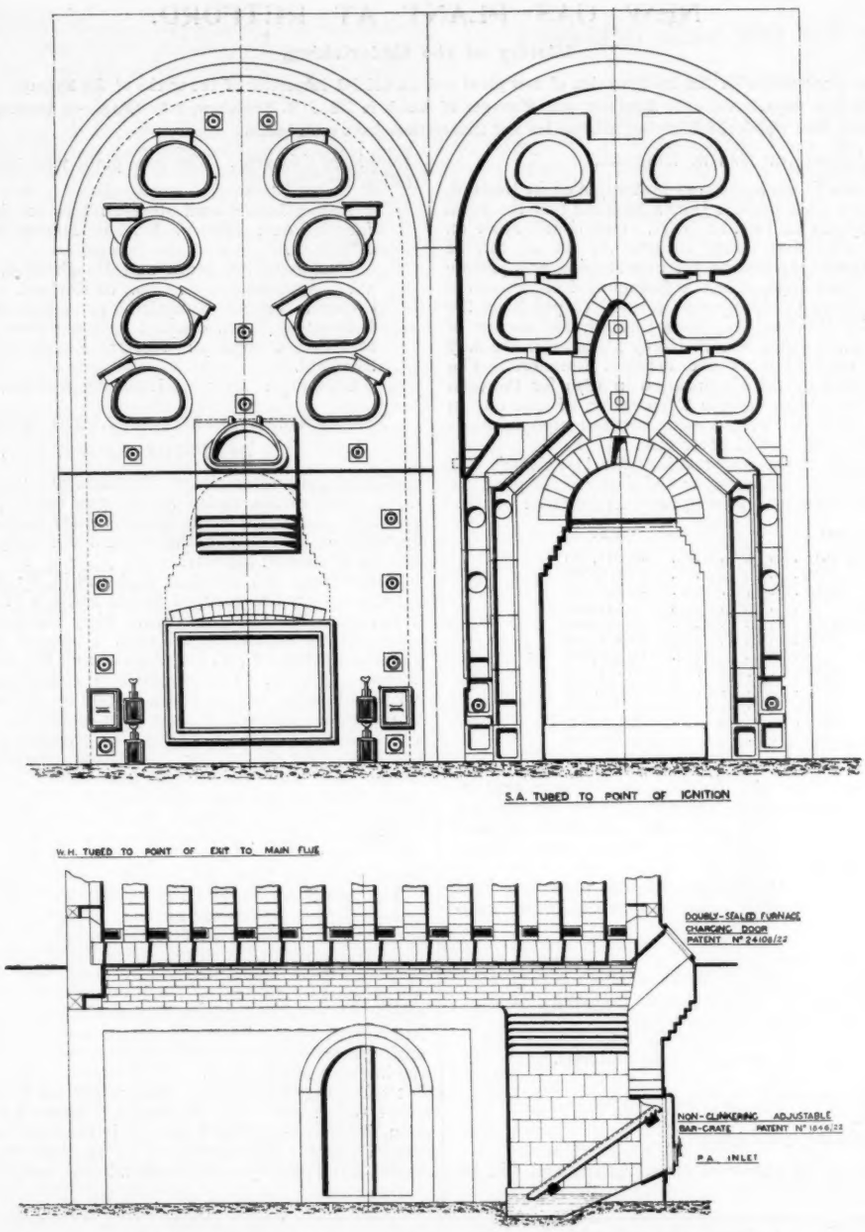
The retorts, Ω shaped, 24 in. by 18 in. by 20 ft. through, and 40 in number, are grouped in five settings of eight through retorts, set in four tiers of two. They are built-up of grooved-and-tongued segments, of such economic shape that three moulds—lettered X, Y, and Z—form all the silica shapes for the complete retorts. The combustion chambers are constructed wholly of silica, and are characterized by the fact that the arches are complete ellipses, having their abutments in the keystones common to both arches and the producer-gas arch, whence stability under the modern combustion chamber temperature of about 1400° C. (2550° Fahr.) is ensured. Silica, as compared with firebrick, possesses the property of growing under a prolonged period of heating. This phenomenon requires to be taken into account by designers of modern settings. The provision consists in leaving the necessary clearances under the main arch, and filling them with a yielding pugged clay.

The producers are 12 ft. deep, and are fitted with "Elland" non-clinkering screen-bar grates. These grates, in effect, are a screen, and the dust or ash falls through the screen-bars as the coke creeps down the grate. This continuous beneficial movement prevents agglomeration of coke, and thus obviates the heavy work of clinkering the fires. There being no clinkering period, there is no periodical loss of heat, so that the potential heat in the form of producer gas passes forward to the setting with greater constancy, both qualitatively and quantitatively, to the increase of efficiency. The furnace doors provide two minor but advantageous features that might be noted. The ashpan doors slide so that the hot inside is never turned towards the man, incommoding his work, as is the case with the orthodox hinged doors. The furnace charging doors are doubly sealed, having the ordinary metal-to-metal seal, and in addition a dust



STEEL-FRAMED BRICK-FILLED RETORT HOUSE AND COAL STORES.

Showing ball-bearing coke truck and gantry to yard.


S.A. TUBED TO POINT OF IGNITION
W.H. TUBED TO POINT OF EXIT TO MAIN FLUE
DOUBLY-SEALED FURNACE CHARGING DOOR PATENT N° 24108/22
NON-CLINKERING ADJUSTABLE BAR-GRATE PATENT N° 1846/23
P.A. INLET

"ELLAND" VERTICAL LARGE-AREA TUBULAR REGENERATOR SETTING.

seal (optional in use). To ease the work of the stoker, each door has a balance weight to facilitate opening and closing.

Regenerators.

Fuel economy depends largely on the degree to which the air for secondary combustion is preheated. High efficiency of heat recuperation depends very much upon the tightness of the dividing wall, and the heat transmission depends on the thinness of this divide. Therefore the sum total of efficient design is the formation of this divide both thin and airtight, and the regenerator of ample size within the available space. These desiderata are well accomplished in the Dempster-Toogood two-ply two-row tubular regenerator, wherein the full height of the heated brickwork is utilized by regenerator tubes, and all waste-heat tubes can be inspected, and cleaned from dust. The regenerators are compartmented for multiple control, so that each side of each quarter-length of the retorts is under definite dampered control.

Having obtained efficient heating, it is necessary to conserve it. To this end, anti-thermic asbestos bricks, 2 in. thick, are built into the front and back walls of the setting, and the bench top itself is paved with a 3 in. layer of insulating porous bricks.

There is a waste-heat boiler of the firetube type, capable of evaporating, when all settings are at work, as much as 3 lbs. of water per lb. of gas-works coke consumed in heating the settings. The steam so obtained is used for general gas-works purposes, and saves the main boiler plant.

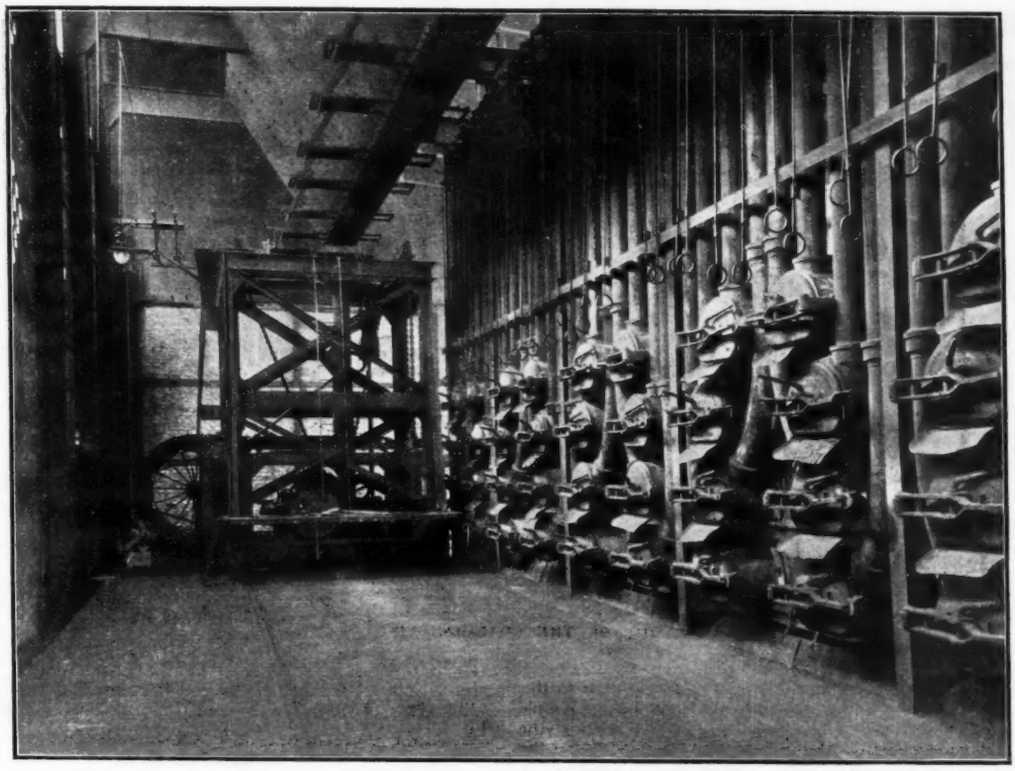
The retort mountings, though of normal type—comprising 7 in. ascension pipes on both sides of bench, hydraulic mains with continuous open lutes, foul main, and tar tower—contain two features of special interest, as follows:

The tar main is arranged immediately under the continuous open lute of the hydraulic main, and is attached thereto by acutely inclined branches. This construction permits auguring throughout the length of the 6-in. tar main right into the tar tower, whereby everything is kept scrupulously clean without the undoing of a bolt or the spilling of a drop of liquor. The usual dip-pipes are replaced by anti-dip valves comprising an inner and outer sleeve. The inner sleeve is some 10 in. above the liquor level, where it remains relatively clean; and the outer sleeve is operated by a lever from the charging floor, so as to raise it above, or lower it into, the sealing liquid as desired during the period of stoking.

The automatic self-sealing retort lids are of the "Elland" patent type, wherein the swinging of the lid into the open or shut position automatically operates the catch into its on or off position, whereby the whole operation of the lid is controlled by one hand. The bench is well braced by rolled-steel joists, and the floors are carried by columns, such that no vibration of either the stoking machine or the coke trucks is transferred to the retort bench.

The incandescent coke, as it leaves the retort, is deposited in large-capacity trucks. These are mounted on ball-bearing wheels, so that they are easily pushed to the outside of the retort house and under the quenching sprays. After the coke is quenched, the trucks are pushed along the gantry, and the coke is deposited in the yard.

The retort house and coal store together form one imposing



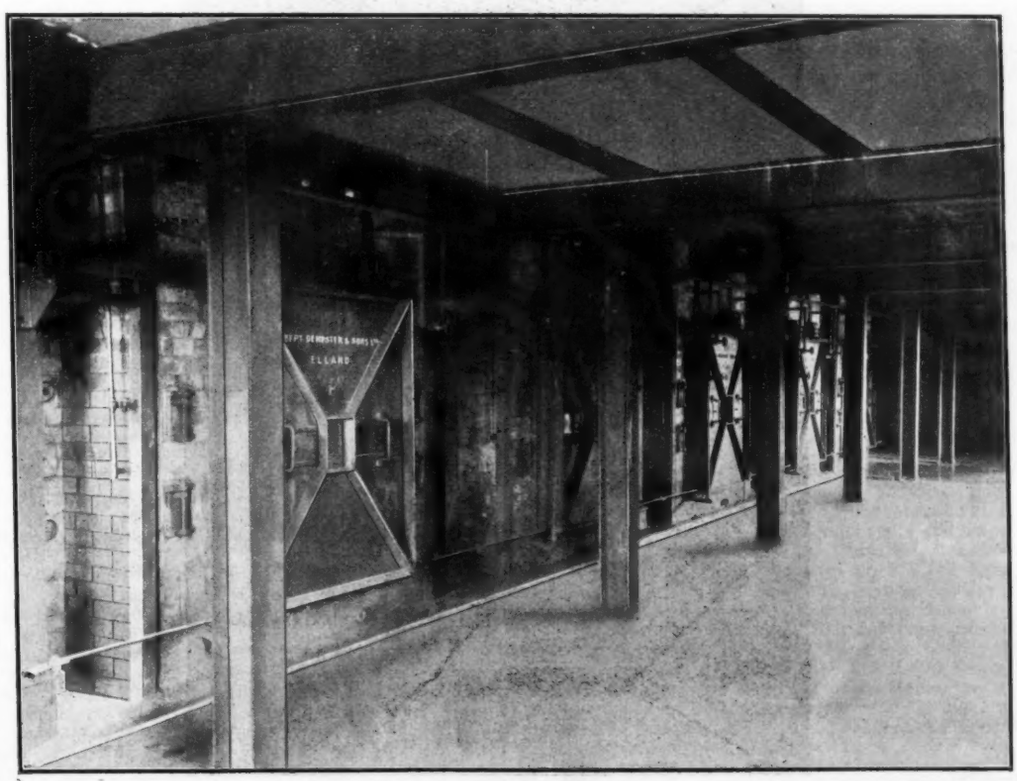
CHARGING FLOOR.

Showing stoking machinery and 48 hours' capacity (week-end) overhead coal storage bunkers.

building 138 ft. long by 56 ft. wide, 52 ft. 6 in. high to eaves, and 70 ft. high to the apex of the main roof. The whole building is of steel superstructure and brick filled—4½ in. thick in the panels, 9 in. thick in the piers, and 14 in. thick in the plinth. The local subsoil being known to be more or less water-logged, special provision was made in the design. The whole of the retort bench, retort house, coal store, and chimney were placed upon a form of reinforced concrete raft, to prevent the superimposed weight from displacing the wet sand from beneath the bench. The periphery of this raft was formed as a 6 ft. retaining curtain.

COAL HANDLING PLANT—W. J. JENKINS & CO., LTD.

The whole of this machinery is arranged inside the main building, so that no part is exposed to the weather, to the detriment of the plant either in wear and tear or in efficiency. The coal is conveyed to the works in carts, which dump their



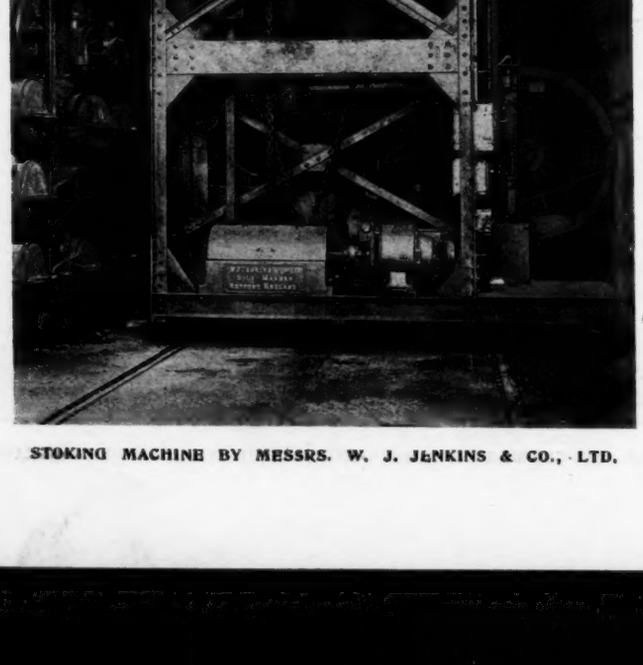
PATENT NON-CLINKERING SCREEN-BAR GRATES WITH SLIDING ASHPAN DOORS.

LAY-OUT OF THE COAL-HANDLING PLANT.

loads into the main receiving hopper. A regulating door to this hopper permits the desired quantity of coal being passed through an automatic feeder into a breaker, which reduces the coal to a convenient size for the stoking machine. Thence the coal passes to an automatic filler. Small coal, however, is directed to the filler via a by-pass chute, thus missing the coal breaker. The automatic filler regulates the flow of coal to the buckets of a gravity-bucket conveyor. The above machinery is contained in a concrete pit with cast-iron lining, sunk about 20 ft. into the ground. The conveyor passes up a vertical tower, and then horizontally near the roof of the retort house over the coal storage hoppers near the retort bench. Along the top horizontal member of the conveyor is fixed a series of tipping cams, which can be put in or out of action at will by the operator. Three such tipping cams are provided over the coal store, by means of which the coal can be deposited into store. Other tipping cams are provided over the coal storage hoppers, for the purpose of filling the latter.

Stoking Machine.

The machine is of the combined type, electrically driven, and embodying the De Brouwer coal projector and the "Jenkins" heavy-type discharging ram. These two are housed in a cage which is capable of being moved in a vertical direction to suit the various tiers of retorts. A telescopic chute stretches between the charging apparatus and a small receiving hopper on top of the machine. All the necessary electrical controls and levers are accessible to the machine operator on his platform. Electrical controls make the machine as near foolproof as possible.



STOKING MACHINE BY MESSRS. W. J. JENKINS & CO., LTD.

HIGH-PRESSURE GAS STORAGE.

An arrangement which, so far as the Rochester (U.S.A.) Gas and Electric Corporation are aware, has never before been attempted in the industry, in connection with the storage of high-pressure gas, has been described in the Corporation's official organ by Mr. William N. Whitney. A number of communities, and several important industries, are supplied with gas by a 6-in. high-pressure main, 12 miles in length; and it is necessary to compress the gas to 30 lbs. per sq. in. at the holder, in order to maintain an efficient service—a large duplex electrically-driven Ingersoll-Rand compressor being employed for the purpose. The rapid increase in the demand for gas made it a serious problem how best to meet the event of an electrical interruption. Conditions at the holder station would have made a stand-by drive, by either steam or gas engines, very expensive; and so it was decided to put down an automatic high-pressure storage tank installation.

The three steel storage tanks eventually employed for the purpose are 10 ft. in diameter and 62 ft. 8 in. long, and have a capacity of 150,000 c.ft. of gas at 150 lbs. per sq. in. A 4 in. extra heavy steel pipe conducts the gas from the tanks through a reducing valve, and an automatic electric valve, to the distribution main. The necessary pressure on the distribution system is maintained under routine operation by the use of a by-pass control; and in case of a power interruption it is necessary to close this by-pass control, or there would be a waste of pressure. There is therefore provided a solenoid-operated valve, which automatically closes when the power goes off. The tanks are recharged when necessary by a 94 c.ft. a minute Ingersoll-Rand compressor. The heavily constructed tanks are of 1 1/16 in. steel boiler plate, with 1 1/2 in. rivets, and are provided with manholes having special gas-proof gaskets, pop valves which will withstand gas leakage, and condensate draw-offs. The piping, fittings, and valves are extra heavy, and must withstand sudden and extreme expansion conditions due to rapid temperature changes. Each tank has two 2 in. pop valves, to guard against the effects of sun expansion; and the system is protected by three 4 in. excess pressure valves.

One of the most interesting features is the design of the automatic electric valves. There are two of these valves in the system—one which automatically opens when the electric power fails, and another which closes at the same time. In principle, these are balanced spring disc valves, which are actuated by counter-weights, released by solenoids when the power is interrupted. In connection with these valves, signal alarms are installed to warn the operator.

For more than two months after the installation was put into operation there was no power interruption; and then one day the automatic siren alarm warned the operator that this had occurred. Within a few seconds he had reached the compressor room, and found that the large compressor had stopped, and that the two electric valves had functioned, thereby feeding gas from the tanks into the system at the required pressure. Ten minutes later the electric service was restored, the large compressor started-up, and the routine operation resumed. Since then there have been other interruptions, and each time the automatic system has functioned successfully. The storage installation, as it stands, can withstand an interruption of four hours' duration (at the period of maximum load), and comprises a reliable stand-by unit of gas distribution in case of temporary failure of the regular system.

THREE-PART GAS RATES.

Last autumn, the City Commissioners of Fort Collins, a thriving town in Northern Colorado, decreed that, as from the beginning of the present year, the three-part rate should be the sole permitted method of charging for gas. The rate enacted by the Commissioners was as follows:

A commodity charge per 1000 c.ft. of gas metered per month	**$0·40**
Plus **a customer charge per customer per annum, payable in twelve equal (monthly) payments** .	**9·00**
Plus **a demand, capacity, or reservation charge per annum, per c.ft. of maximum hourly demand, payable in twelve equal instalments (monthly)** .	**0·32**

The demand or capacity reservations were in all cases to be contracted for on an annual basis, and to be made available in specified standard quantities ranging from 22½ c.ft. to 300 c.ft. an hour.

It thus devolved upon the officials of the Poudre Valley Gas Company to put the three-part gas rate into effect in such a manner as would give the citizens the benefits to be derived from the proper application of this system of charging; and some particulars of how this was done, and of the results, are contributed by Mr. Roy G. Munroe, Gas New Business Manager of the Public Service Company of Colorado, to the "Gas Age-Record." Every consumer was visited, and had explained to him the fact that the rate per minute or per hour at which the customer would desire the Company to guarantee instant service would largely govern the monthly gas cost. It was pointed out that the Gas Company were binding themselves by written contract to guarantee an unfailing supply of gas at the contracted rate per hour, with a strong penalty clause to operate in the event of the Company's failure to meet any demand made upon them for service. While the representative was going into these matters, a gasfitter was busy adjusting all burners, and in ascertaining, by clocking the meter, the exact hourly consumption of the various appliances. When the customer had agreed upon the desired hourly demand, the fitter would instal a demand limiting meter of the specified capacity. In every instance great effort was made to give the customer the most inexpensive form of service commensurate with his requirements; the Company's representative explaining carefully how, by alternating the use of various burners and appliances, the customer could, with entire convenience, greatly reduce the total hourly demand which would be necessary should he insist upon burning all appliances at the same time. He also pointed out that, with the customer's overhead expenses taken care of in the form of a fixed yearly capacity reservation charge, the price per 1000 c.ft. for gas consumed would be so low as to make possible most liberal additional uses of gas.

After the successful completion of the task of inaugurating the three-part rate, it devolved upon the Fort Collins new business department to bring to the citizens a full realization of the many advantages of gas over other forms of fuel; and the Gas New Business Superintendent commenced an aggressive selling campaign. With four sales representatives and a house-heating engineer, he instituted simultaneous campaigns in gas ranges, automatic and manually operated water heaters, house-heating equipment, industrial fuel, and hotel and restaurant appliances. Within sixty days these men sold and had installed house-heating equipment to heat over 125 houses and stores, kitchen equipment for five all-gas hotel and restaurant kitchens, one industrial fuel equipment for the largest bakery in the city, and for a number of consumers domestic ranges, water heaters, and auxiliary room heaters totalling $15,251. As a result, by the end of the sixty days' period the gas send-out was just four times that at the beginning; and the average total price per 1000 c.ft. paid by the consumers had been decreased.

The three-part gas rate has, says Mr. Munroe, already proved of inestimable benefit to the customers of the Poudre Valley Gas Company; but merely a small beginning has as yet been made towards the ultimate possibilities which this method of charging offers the citizens of this and other communities in the way of still further reductions in their gas rates and improvements in gas service.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

June 3-4.—IRON AND STEEL INSTITUTE.—Annual meeting at the Institution of Civil Engineers.

June 7.—EVENING STAR LODGE.—Regular meeting.

June 18.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Visit to Bristol.

June 21, 22, 23.—Summer meeting of the Institution of Heating and Ventilating Engineers, at Scarborough.

June 23.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual general meeting at the Hotel Cecil, under the presidency of the Rt. Hon. Sir Alfred Mond, Bart., M.P. Programme as arranged for May 5.

July 19.—INSTITUTION OF CHEMICAL ENGINEERS.—Annual meeting.

Sept. 9.—"B.C.G.A.," MIDLANDS DISTRICT CONFERENCE.—Smethwick.

INSTITUTION OF GAS ENGINEERS.

Annual Meeting and Visit to Hastings (formerly fixed for June 8-10 and June 11 respectively) postponed.

June 8.—Council meeting.

Blast Furnace Coke Research.—Research work on blast-furnace coke, with a view to identifying the best varieties for this purpose, was recently initiated in the Metallurgical and Fuel Departments of Sheffield University; and the scope of the inquiry is now being extended to include the production of cokes specially suitable for blast-furnace work. The Research Committee has been enlarged for this purpose by the co-option of members connected with the coke making industry. The South Yorkshire Coal Trade Association have appointed as their representatives Messrs. J. H. W. Laverick, J. H. Ashton, G. T. Purves, and P. B. Nicholson. The Coke Oven Managers' Association are also represented on the Committee by Mr. C. P. Finn; and another representative will be appointed shortly. Extensive research work on the coking of coal is contemplated; and for this purpose Mr. Laverick and Mr. Purves, on behalf of their respective Companies, have promised that the coke oven plants at Tinsley Park and Rothervale Collieries shall be placed at the disposal of the Committee.

INSTITUTION OF GAS ENGINEERS.

ANNUAL REPORT OF THE COUNCIL.

The following are the main portions of the report of the Council of the Institution of Gas Engineers for the year 1925-26, which will be submitted at the annual meeting of the Institution, which has been postponed to a date not yet fixed.

Membership.

It will be observed from the tabular statement below that at the end of the year 1925 the total number of names on the register was 1084, as compared with 1057 for the previous year, an increase of 27.

Class of Membership.	At Dec. 31, 1924.	Elected and Transferred in 1925.	Deceased, Resigned, and Transferred in 1925.	At Dec. 31, 1925.	Increase or Decrease.
Hon. members . .	21	8	2	27	6
Members	827	28	21	834	7
Associate members .	160	25	8	177	17
Associates. . . .	11	3	..	14	3
Students	38	9	15	32	— 6
Total . .	1057	73	46	1084	27

The following are the names of those who, since the last report was issued, have been transferred from the class of Associate Member to Member, and who have been admitted as Students.

Transferred to the Class of Member.

F. H. Arnold . . . . . Guernsey.
C. Bateman . . . . . Cardiff.
Fred. Bedford . . . . . Singapore.
Robt. S. Falkner . . . . . Sandown.
Garnet T. Temblett . . . . . Andover.

Admitted as Students.

Robert W. Calderwood . . . . . Spalding.
Philip T. Carpenter . . . . . Sheerness.
Fredk. J. Dent . . . . . Leeds.
Thomas Elworthy . . . . . Thanet.
Regd. LeFevre . . . . . Brentford.
Jackson Summerson . . . . . Luton.
Gilbert C. J. Ware . . . . . Redhill.
John L. Watkins . . . . . Tipton.
Rowland Joseph Williams . . . . . Abertillery.

Deceases.

The Council regret that the deaths of the following members have to be recorded:

Harry Blakey . . . . . Guernsey.
Dr. Hans Bunte . . . . . Karlsruhe.
Chas. Arthur William Codgbrook . . Berkhampstead.
Hubert Dynes Ellis . . . . . Tottenham.
Joseph Fisher . . . . . London.
Henry Peaty . . . . . Birmingham.
Capt. H. Riall Sankey . . . . . London.
William Titley . . . . . Guildford.

Dr. Bunte and Capt. Sankey were honorary members of the Institution; the former having been elected in 1886, and the latter in 1916.

National Gas Council.

The four representatives of the Institution on the Central Executive Board of the National Gas Council for the year 1925-26 have been Messrs. J. Ferguson Bell, Charles F. Botley, H. D. Madden, and John Wilkinson.

Affiliated District Associations.

During the year the Irish Association of Gas Managers has been received into affiliation with the Institution. The eight affiliated District Associations are now represented on the Council of the Institution as follows:

Eastern Counties Association . . . . . Mr. Fredk. A. West.
Irish Association . . . . . Mr. Jesse O. Halliwell
Manchester District Institution . . . . Mr. F. H. Robinson.
Midland Association . . . . . Mr. William E. Caton.
North British Association . . . . . Mr. John Wilson.
North of England Association . . . . Mr. W. W. Atley.
Southern Association . . . . . Mr. Philip G. G. Moon.
Wales and Monmouthshire Institution . Mr. William H. Johns.

Annual General Meeting.

The sixty-second annual general meeting was held at the Institution of Civil Engineers, Great George Street, Westminster, on Tuesday, Wednesday, and Thursday, June 9, 10, and 11, 1925, under the presidency of Mr. J. Ferguson Bell, Chief Engineer and General Manager of the Derby Gas Light and Coke Company. Particulars are included in the report.

H. E. Jones London Gold Medal.

The Council have awarded the H. E. Jones London Medal of 1925 to Mr. George Evetts, for his paper on "The Economics of Gas Production on the Thermal Basis," and it will be presented at the forthcoming annual meeting.

Just previously to his lamented death, Mr. Jones generously made arrangements for the endowment of this Medal, to enable it to be offered each year. The Council, in expressing their appreciation, feel sure the distinction is highly valued by the Institution.

Royal Commission on the Coal Industry (1925).

A questionnaire was issued by the Institution on this report, for the purpose of obtaining information enabling the President to assist in the preparation of evidence on behalf of the gas industry.

Electricity (Supply) Bill.

The electricity proposals of the Government have received the continued attention of the Council. The President, who was nominated to represent the Institution on a Committee appointed by the National Gas Council, prepared a memorandum which was used in connection with the statement presented, embodying the views of the gas industry.

World Power Conference, 1926.

The President has been nominated to serve as one of the representatives of the gas industry on the proposed British National Committee of the World Power Conference to be held at Basle in September, 1926.

Public Works, Roads, and Transport Congress and Exhibition.

This congress and exhibition, on the Organizing Committee of which the Institution is represented, takes place biennially, and was held at the Agricultural Hall, Islington, from Nov. 19 to 26. The session of the congress allocated to the Institution held on Nov. 25 was presided over by Mr. Charles F. Botley, as President of the Institution. Two papers were read and discussed—viz., "Public Lighting by Gas, with special reference to Automatic Systems," by Mr. C. S. Shapley, of Leeds; and "The Valuation of Gas Undertakings for Rating Purposes," by Mr. George Evetts, of Westminster. The Institution also arranged for a paper on "The Use of Tar in the Construction of Roadways," by Mr. Thomas Glover, of Norwich, and Mr. Arthur Collins, formerly City Engineer of Norwich, which was read and discussed at the session under the auspices of the Association of Local Authorities, held on the previous morning.

Royal Sanitary Institute.

Mr. James Campbell, of Dunfermline, and Mr. John McLusky, of Glasgow, were appointed to represent the Institution at the Royal Sanitary Institute Congress, which was held at Edinburgh, from July 20 to 25, 1925.

Wrought-Iron Tubing Committee.

This Committee, consisting of Mr. Albert Stokes (Chairman), Messrs. J. Ferguson Bell, J. E. Blundell, C. F. Botley, Fred Davies, Stephen Lacey, W. E. Price, Samuel Tagg, Frank P. Tarratt, and R. Hy. Ruthven (Hon. Secretary), have met representatives of the tube strip manufacturers, with a view to the drafting of a specification for wrought-iron tube strip, and other steps have been taken in connection with the matter. It is hoped it may be possible to submit this specification at the meeting of the Institution.

Refractory Materials Committee.

The Joint Committee of the Institution and the Society of British Gas Industries consists of Mr. J. P. Leather (Chairman), Dr. J. W. Mellor (Director of Research), Messrs. J. Ferguson Bell, Charles F. Botley, Prof. John W. Cobb, Dr. H. G. Colman, Messrs. H. Hardie, P. N. Langford, H. D. Madden, W. E. Price, T. F. E. Rhead, Dr. E. W. Smith, Messrs. Samuel Tagg and John Wilkinson (representing the Institution); and Messrs. T. Allen, M. Barrett, F. H. Brooke, Albert Cliff, G. V. Evers, J. W. Fagan, W. T. Gardner, G. H. Pearson-Perry, and Frank West (representing the Society of British Gas Industries). The Committee have held several meetings during the year, at which various important subjects have been discussed. Their report is being completed for presenting at the forthcoming meeting of the Institution.

Institution of Civil Engineers, Heat Engine and Boiler Trials Tabulation Committee.

The Institution's four representatives on this Committee are Mr. C. Rhodes Armitage (taking the place of Mr. Walter Chaney, resigned), Mr. W. Newton Booth, Mr. Harold Hollings, and Mr. E. W. L. Nicol. The Committee appointed to prepare codes for tabulating the results of heat engine trials has had to deplore during the past year the death of their Chairman, Captain H. Riall Sankey. Mr. W. H. Patchell has been appointed to replace him.

The work of the Sub-Committees and Panels has made good progress, and a number of joint meetings were held during the past year, at which the codes and accompanying explanatory

notes were discussed. The comments and criticisms made orally or received in writing in connection with these meetings have received the careful consideration of the Committee, alterations to the codes and notes having been made where these appeared necessary. It is expected that a draft of the Committee's report will be published towards the end of May. The Committee are desirous of receiving comments on the various codes and notes contained therein, in order that these may have consideration before the publication of the final report at the end of the year.

Shipping Engineering and Machinery Exhibition.

Mr. Charles Botley represented the Institution on the Committee of this exhibition, which was held at Olympia, from Nov. 23 to Dec. 5, 1925. An official visit of the Institution to the exhibition took place on Dec. 2, on the invitation of the General Manager, Mr. F. W. Bridges.

Smoke Abatement League of Great Britain.

The Institution last year became an affiliated member of the Smoke Abatement League of Great Britain. An invitation for the appointment of a representative to serve on its Executive Committee has since been accepted; the President for the time being having been nominated. A conference was held at Buxton, in October, 1925, which Mr. John Wilkinson (Vice-President of the Institution) attended. The Council have extended the patronage of the Institution to a Universal Smoke Abatement Exhibition and Conference, which the League proposes to hold at Birmingham, in September, 1926.

Solid Smokeless Fuel Conference.

Under the joint auspices of the Society of Chemical Industry (Chemical Engineering Group and Yorkshire Section), the Institution of Chemical Engineers, the Institution of Gas Engineers, and the Midland Institute of Mining Engineers, a conference on Solid Smokeless Fuel was held in Sheffield, on Nov. 20, 1925. Mr. Charles F. Botley was present as the representative of the Institution.

Antwerp International Gas Exhibition.

The patronage of the Institution has also been extended to the Antwerp International Gas Exhibition, to be held from May 1 to 31, 1926. Mr. Charles F. Botley, as President of the Institution, has been appointed an honorary member of the Exhibition Committee. Mr. A. F. P. Hayman, of Antwerp, and Mr. C. S. Shapley, of Leeds, were nominated to represent the Institution at the opening ceremonies.

National Illumination Committee of Great Britain.

The five representatives of the Institution on this Committee are Mr. W. J. A. Butterfield, Mr. J. G. Clark, Dr. H. G. Colman, Mr. H. E. Copp, and Mr. Robert Watson. The Chairman (Lt.-Col. Kenelm Edgcumbe) presented his report for the year 1925. The report was reproduced on p. 407 of the "JOURNAL" for May 26.

British Engineering Standards Association.

The Association has issued a report of progress of work of the British Engineering Standards Association Illumination Committee, which records the publication of the specification for portable photometers, the glossary of terms and definitions used in illumination and photometry, and the specification for industrial reflector fittings for electric lighting (No. 1). A Sub-Committee is now engaged on the drafting of a specification for illumination of translucent glassware for interior use. The Street Lighting Committee has made very good progress; and it is hoped that a few more meetings will see the completion of the specification in its preliminary form ready for a conference upon it with those bodies who are responsible for street lighting. A Sub-Committee on Photometric Integrators has been appointed in association with that on Illumination Glassware. A considerable amount of research work is being done for the various Sub-Committees by the Department of Scientific and Industrial Research, the research laboratories of the General Electric Company, and the lighting service bureaux of the Electric Lamp Manufacturers' Association.

Optical Convention, 1926.

The Institution identified itself with the Optical Convention, 1926, which was held at the Imperial College of Science and Technology, South Kensington, from April 12 to 17, under the presidency of the Astronomer-Royal, Sir Frank Dyson, LL.D., F.R.S.

Leeds University Development Scheme.

In response to an appeal for funds for the extension of the University, Leeds, a donation of five hundred guineas has been made for application to the Coal Gas and Fuel Industries Department of the University, where the research work for the Institution, which has been of so much value to the industry, is carried out.

Liquor Effluents.

At the request of the National Gas Council, the Institution has undertaken a research on questions with respect to the treatment of effluents from gas-works. A Special Committee will be dealing with the matter, assisted by a research chemist. A questionnaire on the subject has been issued to members of the Institution.

Engineering Abstracts of the Institution of Civil Engineers.

It has been decided that the Institution of Gas Engineers should collaborate with the Institution of Civil Engineers and other engineering societies in the production and publication of abstracts of papers and articles published in foreign transactions and periodicals on engineering subjects, and on scientific subjects applicable to engineering theory and practice. The abstracts have hitherto been prepared by the Civil Engineers alone, and that Institution will continue to supervise their production. Mr. Thomas Hardie has been appointed to represent the Institution of Gas Engineers on the Advisory Panel.

Gas Investigation Committee.

The work approved by the Gas Investigation Committee after discussion, and carried out during the year, has been of two kinds. In the first place, it was believed to be very desirable that the investigation of thermal efficiency obtainable from the combustion of different grades of gas in the appliances commonly used should be supplemented by a very careful examination of the nature of the products of combustion from such appliances, particularly the investigation and determination of such products of incomplete combustion as carbon monoxide, when they were produced in quantities, however small. This branch of the work has been carried out by Mr. James W. Wood, assisted by Mr. G. B. Howarth, at the Meadow Lane Gas-Works of the Leeds Gas Department; and the Committee records its appreciation of the patience and skill they have exercised, at the same time taking the opportunity of thanking the Leeds Gas Department and the Manager (Mr. C. S. Shapley) for the facilities which they have continued to extend in a laboratory placed at the disposal of the Committee at the Meadow Lane Gas-Works.

Another field of work on which the Committee has entered after careful deliberation is a complete and systematic examination of the influence which various factors exert in determining the results of carbonization—factors which, in most cases, are known to be operative, but concerning which quantitative knowledge is not forthcoming. Dr. Parker and his assistants, Mr. Kerr and Dr. Monkhouse, have been engaged in the investigation, and have been specially occupied, as an initial stage, with the study and effect of size of coal during carbonization. The Committee would like to express its appreciation of their work.

It is intended to communicate the report of all the investigations carried out for the Committee at the forthcoming meeting of the Institution.

Livesey Professorship.

Work has proceeded at the University of Leeds in the Department in charge of Prof. Cobb, both in the training of gas engineers and fuel technologists, and in research work of various kinds. In addition to the normal courses, special lectures were given in the spring term on Gas-Works Practice by Mr. T. F. E. Rhead (Chief Chemist of the Birmingham Corporation Gas Department) and Mr. H. Hollings (Chief Gas Chemist of the Gas Light and Coke Company); on Benzole, by Mr. W. H. Hoffert; and on Refractory Materials, by Prof. Cobb and Dr. Houldsworth.

Research work undertaken includes that of the Gas Investigation Committee and that of the Joint Benzole Research Committee of the National Benzole Association, and the University of Leeds, which issued its third annual report in March. Senior students have also been occupied with investigation into some of the sulphur compounds in gas, scaling of steel in different furnace temperatures, and the action of steam and carbon dioxide on special cokes.

The staff of the department, including salaried research workers, now number twelve.

Gas Research Fellowship.

Mr. C. B. Marson has continued to hold this Fellowship, and has followed further an inquiry into the influence of the ash constituents of coal on its behaviour in carbonization and gasification. This year he has been occupied specially with the the results of gasification in steam, which have proved very interesting, and are being prepared for reporting to the Institution, in the form of a joint paper by Mr. Marson and Prof. Cobb.

Corbet Woodall Scholarship.

Mr. A. G. Grant has been holding this scholarship for a fourth year, during which he has been occupied entirely in research work, under supervision, on the behaviour of ordinary and special cokes in slow currents of steam. The results of this work will be submitted in the form of a thesis for the Honours B.Sc. Degree in Gas Engineering this year. Mr. Grant's entirely satisfactory tenure of the scholarship will then cease, and the election of a successor will be necessary.

LIBRARY.

The Council desire to express their thanks for the donations to the library which have been made during the year, a list of which is appended to the report. Members are invited to present works of gas engineering interest, whereby the value and utility of the library may be further enhanced.

ACCOUNTS.

A copy of the accounts for the year ended Dec. 31, 1925, certified by the Auditors (Mr. Sydney Y. Shoubridge and Messrs. Wood Drew & Co.), is also appended to the report.

CHAS. F. BOTLEY, *President.*
WALTER T. DUNN, *Secretary.*

May 21, 1926.

BENEVOLENT FUND REPORT.

The following is the report of the Committee of Management of the Benevolent Fund of the Institution for the year 1925-26:

The Committee of Management beg to report, with reference to the accounts for the year ended Dec. 31, 1925, that the total sum of £726 12s. 11d. was received, consisting of £289 6s. subscriptions, £263 7s. donations, £139 8s. 10d. interest on investments, £5 3s. 11d. interest on bank deposit, and £29 7s. 2d. refund of income-tax. Included in the donations is the amount of £100 which was kindly contributed by Alderman Fred. J. West, C.B.E., ex-Lord Mayor of Manchester, and has been invested, £25 from the Redditch Gas Company, and also the special donations received in response to the appeal of the President of the Institution, Mr. J. Ferguson Bell.

Expenditure has amounted to £586 16s. 10d., made up as follows: Assistance to widows, orphans, and members, £533 7s.; printing and stationery, £35 9s. 6d.; postage, receipt stamps, &c., £11 6s. 10d.; appointment of new Trustee, £6 13s. 6d. Deducting the donations, as they are not a regular source of income, the excess of expenditure over income is £123 10s. 11d., showing the urgent necessity of increasing the annual subscriptions. The Committee therefore heartily thank all who have assisted during the past year, and would earnestly appeal for the help of those members whose names do not appear on the list. There were 423 subscribers during the year, while the total membership roll of the Institution is 1096.

During the year under review 16 grants have been made, and £44 more was voted for relief as compared with the previous year.

The fund has, unfortunately, suffered by the deaths of a number of regular subscribers. Included among them is Mr. H. E. Jones, a Trustee of the fund, who always took a great interest in its work, and whose loss is very much regretted. Mr. D. Milne Watson consented to serve in the place of Mr. Jones, and was duly elected at the annual meeting of the contributors in June, 1925.

Mr. P. S. Hoyte, of Plymouth, and Mr. A. Kellock, of Airdrie, are the two members of the Committee of Management who retire in 1926 in order of rotation after three years of service. The Committee have nominated Mr. R. Robertson, of Bristol, and Mr. J. W. McLusky, of Glasgow, for election as their successors.

DOMESTIC COKE.

By M. BARASH.

Reprinted from the May Issue of "West's Gas" (West's Gas Improvement Company, Ltd.).

Authentic figures with regard to the comparative value of different cokes as domestic fuel are none too numerous, so that the following summary of information supplied by an American authority should prove of value. It will be observed that the investigation has been carried out mainly from the point of view of the use of the fuel in closed systems, such as stoves and domestic (central heating) water boilers. There is still in this country a large field for the development of this outlet for coke, so that in this connection the conclusions arrived at in these tests should be of real interest to the gas industry.

The research was carried out at the Massachusetts Institute of Technology, Cambridge, Mass. The samples of coke submitted for test were: (*a*) Vertical coke (steaming 10 p.ct.) and (*b*) Everett coke oven coke; and these were compared with (*c*) horizontal retort coke and (*d*) anthracite coal.

The samples, both screened and unscreened, were examined by the methods developed for the American Gas Association. Briefly, these tests are:

1. *Ease of ignition—i.e.*, time required for the fuel to ignite under definite conditions.
2. *Efficiency of combustion*, as determined by the ratio $CO : (CO + CO_2)$ in the flue.
3. *Banking tests—i.e.*, time during which full fire will remain banked.

In all the tests the fuel was burned in an "Ideal Arco" round water boiler (grate area 1·4 sq. ft.). The air for ignition and combustion was passed through a standard orifice, was preheated, and led into the ash pit. Stack draught was maintained constant by means of a steam jet. Flue gases were sampled and analyzed at regular short intervals, temperatures were measured by thermocouples connected to a recorder, and all precautions were taken to avoid air leakage into the furnace.

1. *Ease of Ignition.*—Ignition was effected by a regulated stream of air, preheated to 750° C. The time interval between the start of the preheated air and the sharp increase in temperature of the fuel bed (as recorded by an embedded thermocouple) together with the temperature at which this sharp change occurred, and the increase in CO_2 content of the flue gases, gives a measure of the ease of ignition of the fuel.

The figures obtained were as follows:

Fuel (Unscreened).	Time of Ignition.	Temp. °C.	Time of Ignition, from CO_2 Content of Flue Gases.
	Mins.		Mins.
Vertical coke	41	510	42
Oven coke	56	620	58
Anthracite	77·5	520	78

The horizontal coke shows a somewhat shorter time of ignition (36 mins.) than even the vertical coke, but the results are not strictly comparable with those given above, as the tests on the horizontal coke were carried out on the material screened through a 1½ in. square mesh and remaining on a ¾ in. square.

2. *Efficiency of Combustion.*—The reactivity of coke is determined by its tendency to reduce CO_2 to CO under specified conditions. Too high a reactivity is a disadvantage in the case of a domestic fuel. Depending on the properties of the fuel and the time of contact between the fuel and primary air, varying proportions of the initially formed CO_2 are reduced to CO.

The utilization of the potential heat in the CO over the fuel bed is difficult to carry out without having recourse to more draught regulation than the attendant is likely and willing to give. Therefore, if other factors are equal, the most satisfactory domestic coke would be one effecting a minimum reduction of CO_2 to CO.

For efficiency of combustion, the fuels were tested under standard conditions of fuel depth, rate of flow and temperature of air, &c., and the flue gases were sampled and analyzed every five to eight minutes.

In the case of both the screened and the unscreened samples of the fuels, the vertical coke shows the lowest mean $CO : (CO + CO_2)$ ratio, and, therefore, the greatest efficiency of combustion. The following results demonstrate this relation.

Sample.	$\frac{CO}{CO + CO_2}$.
Vertical coke (unscreened)	0·322
Oven coke	0·376
Horizontal coke	0·511
Anthracite	0·383
Vertical coke (screened)	0·247
Oven coke	0·347

These results, coupled with those obtained for ease of ignition, showed a marked superiority of vertical coke over the other fuels.

3. *The "banking time" test* is a simple determination of the rate of cooling of the fire-bed after an excess of fuel has been added, the thermocouple embedded in the fire, and all draughts shut off. The results obtained in these tests show that in this respect also vertical coke is superior in that the banked fire retains its ignition temperature for a longer period than do the other fuels under the same conditions of treatment.

While on the subject of domestic coke, one cannot forego the opportunity of analyzing the reasons for the reluctance of the householder to use this fuel instead of, or in conjunction with, coal. A large proportion of the forty million tons of coal burned annually in the domestic grates of this country should be replaced by coke. The gas industry has had every opportunity recently of accumulating information with regard to the properties required in coke for its various uses; and coke eminently suitable for the domestic grate is now being made and is almost universally available. The domestic consumer knows well what are the properties of a suitable coke, and generally he is eager to adopt such a fuel. And the gas manager realizes that he must produce a dry, clean, graded

coke, which is readily ignitable and will burn freely. To attain these qualities he is gradually eliminating the wet quenching of his coke, he is carefully choosing his coals, and he is carefully controlling his plant and system of carbonization. But there is still far too much coke of very inferior quality in the market. To try to light a fire with it would be ridiculous—placed on a coal fire, it decrepitates with alarming reports, and scatters red-hot cinders far and wide; in appearance it is wet and dirty. Is it any wonder, when such material is made available, that a prejudice exists against the use of coke in our homes?

Mr. Barash concluded his article as follows: The moral for the householder is, order your coke direct from the gas-works, specify "dry, vertical coke, graded for domestic use," and see that you get it!

In all the great towns, coke and gas are now in a position to solve the domestic smoke problem without special legislation and without imposing any further burden on the householder.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

ANNUAL MEETING.

The Annual Meeting of the Association was held at the County Hotel, Newcastle-on-Tyne, on Friday, May 28—Mr. W. W. ATLEY, of Stockton (President), in the chair.

The statement of accounts showed a credit balance of £9 6s. 5d.

On the motion of the PRESIDENT, it was agreed to contribute £10 to the Benevolent Fund of the Institution of Gas Engineers.

The following were recommended for membership of the Association:

Member.

Mr. W. Lister, Crook.

Associates.

Mr. J. Dewart, Sunderland.
Mr. R. B. Hodgson, Darlington.
Mr. F. R. Simpson, Newcastle.

COMPETITION WITH ELECTRICITY.

By H. E. COPP, M.Inst.C.E., of Hull.

The gas industry is indeed fortunate in that during the past thirty years it has had to meet increased competition from the electrical industry. Competition is the best stimulant for an industry, whereas Government control, State aid, or guarantees for capital can only act as narcotics, and exercise a lethargic effect on any industry which may be either unable to support itself or unfortunate enough to be the victim of any such expedient. Though it appears to be the general opinion of the technical leaders of the electrical industry that the Electricity (Supply) Bill is an unnecessary measure, it will undoubtedly be popular, as it appeals to the imagination of both the politician and the man in the street, who is, after all, a very important person, but who suffers from hallucinations when electricity is concerned. The electrical industry has an assured future, and is in no need of adventitious aid. The mere facts that whereas in this country only 110 KW. per head of population are at present used, as against 700 KW. in Switzerland, 500 KW. in Norway, and 500 KW. in America (1000 KW. in Chicago), show that there is a vast field for electrical enterprise. It must be remembered, however, that in some of these countries there are large sources of power due to the possibility of utilizing water stored by natural or artificial means at high elevations. It may be stated as a broad principle that the greater the elevation at which such water may be stored, the less will be the capital expenditure necessary for its utilization for the generation of electricity. It is for this reason that such schemes as the harnessing of the power of tides, as suggested in the Severn Barrage scheme, do not arouse the enthusiasm of engineers who have studied these problems from the financial as well as the technical aspects. The destinies of both the electrical and the gas industries in this country are inextricably bound up in the problem of cheap coal—our greatest need and greatest national asset. It seems only natural, therefore, that the two industries should develop collaterally. Indeed, they are doing so in a remarkable fashion in America, a country we are taught to regard as the home of electricity. We, as Britishers, must not forget, however, that our countrymen were pioneers in the discovery of electricity and its application to the service of man, as in many other important developments which have done so much to provide our present-day amenities, and to create what we call our modern civilization. There can be no doubt also that the gas industry may be justly credited with its full share of inventive genius.

Sir John Snell, Chief Electricity Commissioner, stated in his recent speech at the annual dinner of the electrical trades that in Chicago the consumption of electricity is 1000 units, and that of gas 20,000 c.ft., per head of population, as against 9000 c.ft. per head of the Gas Light and Coke Company's consumers, which seems to show that even cheap electricity is not likely to displace gas. America, however, seems to have accumulated a large share of the wealth of the world, so the analogy may not be complete, as the gas supplies in that country are in few cases less than $1 per 1000 c.ft.

In considering the subject which has been chosen as the title of this paper, it is first necessary to ascertain, as far as possible, the nature of the competition which we are likely to encounter. I therefore make no apology for referring at some length to certain aspects of the Electricity (Supply) Bill which is now before Parliament. One fact stands out clearly—namely, that the Bill in its present form does not commend itself to the most far-seeing and practical men of the electrical industry; the most disturbing feature being that it will take the control of the industry out of the hands of those who have been largely responsible for its development, and vest it in the hands of others who may be less competent to guide its destinies—a proceeding not always unattended by risk. The argument that unless some alteration is effected in the method of control, gathering it more or less under the wing of the Government (owing to its incapacity to guard its own interests), there is a danger of the ultimate nationalization of the industry, would appear to be singularly fatuous. In the present form of the Bill it looks as if the more efficient stations must pay for the delinquencies of those less efficient until such time as sufficient capital, guaranteed by the Government and future Governments on the security of the taxpayer, has been raised for the purpose of scrapping the latter, and correspondingly increasing the capacity of the former. Surely, if the electrical industry in this country is so inefficient, it must already have far too much capital invested in it; and the present quixotic proposal is to eliminate a large proportion of the more or less unremunerative capital by the expenditure of what will ultimately mean a further vast amount of fresh capital. The solution of the problem of cheap electricity will undoubtedly be found in the reduction of capital and distribution charges, coupled with a higher load factor (which may be called the "electrician's dream").

In Kempe's Engineers' Year Book for 1924, Prof. S. Parker Smith, D.Sc., states that in respect of the electrical industry the capital charges usually represent about 50 p.ct. of the total cost of supply. The coal bill represents 25 p.ct. of cost. Distribution capital represents about half the total capital; and transformation, distribution, and maintenance of meters represent 20 p.ct. of the total cost. Contrast this with the gas industry, the capital charges of which do not exceed one-quarter the selling price of gas—hence the strong financial position of the gas industry as compared with the electrical industry.

On reading the Bill, one cannot help feeling that it will be a most fruitful field for litigation, and in the near future is more likely to benefit the legal profession and the manufacturer of apparatus than the consumer of electricity. Furthermore, many large and well-conducted undertakings will find that the powers and rights conferred on them by their Acts of Parliament no longer exist, or have been placed in the hands of others, involving bureaucratic control and the payment of a new host of officials. Moreover, the Bill perpetuates the existing, and often inequitable, methods of charging for electricity, such as the maximum demand system, and that of compounding on the basis of rateable value, which, in effect, makes the careful consumer pay for the current used by his more improvident or less considerate neighbour.

Up to the present no authentic figures have been produced showing, in the light of scientific fact, what advantages are likely to accrue from the unification of electricity supplies—for example:

(1) The capital sum it will involve.
(2) The amount of new capital necessary to provide for the output represented by obsolescent plants.
(3) The cost and losses to be expected from long-distance transmission of current.
(4) The losses due to transforming, and in very many cases rectification (according to present quoted practice these can hardly amount to less than 20 p.ct.).

Full information on such matters as estimated by a committee of experts should have preceded the introduction of the Bill.

With regard to periodicity, this varies in practice from about 25 to 120; the lower being used for traction work only. With very low periodicities, incandescent lamps would give an unpleasant pulsation of light. For incandescent lighting with alternating current, 100 cycles per second has been a very common periodicity in the past; but owing to the facts that the demand for power in connection with traction work and other industrial purposes has been steadily on the increase for some time past, and that alternating current motors can be designed

to give better performance and higher efficiency at all loads with a low frequency, the tendency is to reduce the periodicity to the lowest that will allow of arc and incandescent lighting, while still maintaining a high efficiency in the whole of the plant; the generators and transformers being both heavier and more expensive for low frequencies.

The minimum frequency for successful lighting is usually stated as near to 40 cycles per second, and even at 50 cycles per second the persistence of vision prevents any pulsation of the light being noticeable. With incandescent lamps for low voltages or high candle-power, the filaments have a certain temperature lag which allows of successful working with a slightly lower frequency than is found necessary for arc lamps. The standardization of frequency will doubtless prove a very expensive luxury.

"Engineering" in a recent leading article stated that the present average price of electricity in this country is 2·047d. per B.O.T. unit, and that the present rate of increase is 19 p.ct. per annum. It further estimates that when the consumption reaches 500 B.O.T. units per head of population (which would be in 1940), the price would be 1·5d. to 1·75d. per unit. This does not appear to offer such roseate prospects as the Government and other enthusiasts predict; and it is much more likely to be a correct prognostication than others which are continually appearing in the public Press—which, it can only be assumed, anticipate greater returns from publicity than the gas industry has to offer. Published statistics of the costs of generation prove conclusively that the very large or "super" stations show very little, if any, advantage over those of many well-managed stations of moderate size; and furthermore, the cost of fuel is approximately only one-quarter of the total charges against revenue.

Not the least disturbing feature of the Bill is the fact that it apparently contemplates the raising of long-period loans guaranteed by the Government, even to the extent of sixty years for repayment. Any layman must appreciate the fact that electric machinery, cables, and other apparatus are liable to become obsolescent in less than one-sixth of such period. The result can only be that the industry will be further overloaded with dead capital.

Before leaving the subject of the Electricity Bill, I cannot refrain from referring to what appears to be the irresistible fascination of the application of electricity to the great agricultural industry. It is imagined that when the gridiron of overhead cables is completed, electricity will be available for even the most isolated farms. The idea is obviously absurd, as the transmission cables will carry an immense pressure; and how many farms will be able to absorb sufficient current to pay the interest on the cost of distributing cables and transformers (one for each farm or group of farms) which would be necessary to give supplies at suitable pressures? Such applications may be possible in certain districts of America or Canada; but the residents of such countries would regard most British farms as merely allotments.

To justify the Bill, it will be necessary for electricity to be sold universally at a price which is competitive with any other form of lighting, heating, and power, and at the same time show a profit which will pay the interest on the capital expended, after allowance for depreciation and renewals, and also build up a fund for the redemption of loans.

Notwithstanding all I have said up to now, the gas industry is confronted with a great problem; and whether it will be accentuated or diminished by the operation of the provisions of the Electricity Bill, I leave others to judge. I must, however, emphasize the fact that the electrical industry is continually making immense strides in the efficiency of generation. As far as can be ascertained from the incomplete data available, the present average efficiency of generation in Great Britain only represents something like 11 p.ct. of the total heat of the coal used, and only about two or three years ago the Hon. Sir Charles Parsons considered that the ultimate efficiency which would be realized would not exceed 25 to 27 p.ct. But we have now reached a period when amazing results are being attained, principally due to the very much larger generating units which are being constructed, to the principle of the reheating of steam between turbine stages, and to the fact that boiler efficiencies of over 90 p.ct. have been attained. At Crawford Avenue Station, Chicago, a unit of 50,000 KW. has been installed which is expected to give an over-all efficiency of nearly 30 p.ct. of the total heat of the coal used, which, it is interesting to note, has been constructed by the Parsons Company of this country, and transported across the Atlantic Ocean. The new Manchester Station shows an efficiency of 21·7 p.ct.

According to "Machinery," the Brooklyn Edison Company have ordered a set of 115,000 H.P., for which no less than 150 million gallons of water per day will be required for cooling purposes. What a reflection on the efficiency of the utilization of the forces conferred upon us by nature, and what a large gap it leaves in the periphery of the Carnot cycle! But such facts should cause us to pause and consider whether our industry is commanding skill of such a high standard as that necessary for the design of such colossal engineering feats. Now all this evidence of the increased efficiency and competition, which may in the immediate future be expected from our friends and rivals, need not disturb us if we continue to strive for greater efficiencies in our own industry.

The following may be regarded from our side as a modest estimate of the comparative thermal efficiencies of electricity and gas.

Assuming that coal used in the boilers of the larger power stations has a calorific value of 11,500 B.Th.U. per lb., and that the average consumption of coal is 2 lbs. per B.O.T. unit (the average of the larger generating stations in Britain being nearer 2½ lbs. per B.O.T. unit),

23,000 B.Th.U. give 3440 B.Th.U. (equal to 1 B.O.T. unit), or approximately 15 p.ct. efficiency; whereas, assuming that gas coal has a calorific value of 14,500 B.Th.U. per lb., and taking the somewhat low estimate of 75 therms per ton, 55 p.ct. of coke and breeze (available for sale), and 10 gallons of tar per ton, an efficiency of 75 p.ct. is obtained.

Assuming coke and breeze at 12,000 B.Th.U. per lb., and tar at 16,200 B.Th.U. per lb.:

		P.Ct.
14,500 B.Th.U. gives as gas	3348 B.Th.U., or	23
" " " coke	6600 " or	46
" " " tar	803 " or	6
Total		75

If we include the calorific value of our coke and tar, which is undoubtedly justifiable, at the Hull Station of the British Gas Light Company, Ltd., we are now recovering over 80 p.ct. of the heat value of the coal we use. Such facts must not deter us from further efforts, nor must we be misled by the somewhat flattering terms in which the gas industry has been referred to by certain speakers during the debates on the Electricity Bill. There are, however, many ways in which we may promote the interests of the industry; the first and foremost being that of producing gas of constant and invariable quality at the lowest possible cost. Variation in quality is not only grossly wasteful under the system of charging by the therm, but is certain to cause dissatisfaction to the consumer. Cheap gas can only be supplied by undertakings who are prepared to scrap obsolete plant, and embark on the wise expenditure of capital in providing new and efficient plant. If this can be done over a reasonable period out of revenue, so much the better. The axiom that "profits are made in the retort house" is as true as ever. Cheap production is the keynote to the success of the industry. But we must possess the means of knowing at all times exactly what our costs are; and in order to do this, it is necessary to keep accurate records of costs in all departments. These may conveniently be divided under from 10 to 25 headings, according to the size of the works, and a complete system of costing under each heading kept in such a way that they may be readily observed and compared with those of corresponding periods, also, as far as possible, with other works of comparable size.

We must next see that our purification leaves nothing to be desired. The presence of even the merest trace of SH_2 or NH_3 in town gas is unpardonable. It will further be a great advantage to the industry when a satisfactory method has been evolved for the reduction or elimination of CS_2 compounds; for even with a content of no more than 25 grains of CS_2 per 100 c.ft., if large quantities of gas are consumed in a room with inadequate ventilation, its presence can often be detected by anyone possessing particularly sensitive olfactory organs, though there is strong scientific evidence that the atmosphere in such a room (especially if many persons happen to be present) is actually purer when lighted with gas than with electricity.

Coke is the most important of what are termed the residual products of gas-works, and there are many engineers who hold the opinion that we should not produce surplus coke, on the ground that it is capable of being totally gasified. The controversy is outside the scope of this paper, but it is doubtful if, at present, gas of such low calorific power as that produced under any system of total gasification would meet the needs of the community, and it is certain that most of the apparatus in use would be unsuitable for the effective utilization of such gas, so that we may assume that gas coke will be produced in large quantities for many years to come. It is the general opinion of gas engineers that, up to the present, sufficient attention has not been given to the subject of the production of coke in suitable form for its many uses. Not only should the raw coal be scientifically blended with this object in view, but the coke should also be carefully graded into the various sizes suitable for use in specially adapted open grates, central heating boilers, and other purposes. After such grading there will necessarily remain a large proportion of dust or fine breeze; and wherever there is a neighbouring electricity generating station, there also is an ideal method of utilizing such material. When mixed with a proportion of bituminous coal, the evaporative powers of coke dust are practically equal to that of coal when used under boilers fitted with mechanical stokers. Every electric generating station is so equipped nowadays. At the Hull Station of the British Gas Light Company, coke dust is thus used in a mechanically stoked water-tube boiler evaporating 23,000 lbs. of water per hour with an average efficiency of 6·61 lbs. of water evaporated per lb. of fuel from and at 212° Fahr. The further great advantage, which still remains to be brought home to the electrical engineer, is that the emission of smoke so common to most generating stations may be almost entirely

avoided. At the new Barton Station of the Manchester Electricity Works this system is being employed with marked success.

In competition with electricity, we must first have complete confidence in the advantages our industry has to offer to the public, and scrupulously avoid any statements or claims which are not strictly in accordance with facts. Indeed, there is no reason for so doing. Judicious advertising is undoubtedly a very effective and necessary means of promoting our interests; but I believe that the very best is that of establishing showrooms, in which there must be ever-changing and artistic displays of apparatus, conveying to the public that we have their interests at heart, and that we are always ready to give our best services. When these objects are accomplished, we shall have a permanent and irresistible advertisement which will serve us to much greater advantage than spasmodically publishing newspaper advertisements containing more or less stereotyped statements which convey little or nothing to the prospective consumer. There is such a thing as psychology in advertising. The American apparently believes that if you say a thing often enough, people will believe you; but I do not think this exactly applies to the British temperament, and I would suggest that we are rather too apt to believe that American business methods and systems of publicity are as suitable for this side of the Atlantic as for the other. For instance, it is no use repeating "Elmwick's Pills" or "Bland's Soap," unless accompanied by some short phrase conveying the idea of either their cheapness or their efficacy. In the same way advertisements such as "Cook by Gas," "Use Gas for Lighting," &c., are not likely to bring us much business. Advertisements, in order to appeal to the people who are able to do us most good, must be neither fulsome, nor puerile, nor pawky.

The accompanying charts show the continued increase in the number of gas appliances supplied to consumers of the British Gas Light Company in Hull. The first illustrates the effect of opening the new showrooms in 1923, and the second the increase in the quantity of gas supplied in the Company's area since 1919.

The question of district pressures is also a very important one. It is not only necessary to comply with the provisions of the Gas Regulation Act, 1920, as regards minimum pressures, but we must also see that no consumer's pressure is at any time excessive as compared with his minimum pressure—in cases where great variations exist it is necessary to provide either district or individual governors. It is useful to obtain charts of pressures in various districts, and to show thereon the hourly output of gas from the works, so that it can be ascertained how far the two synchronize.

I would now refer to one or two matters which may at first sight appear to be somewhat trivial, but which, I submit, are not without importance in meeting electrical competition. Some engineers are apparently content to sacrifice the lighting load, and to accept the electrician's oft-repeated formula that "the day of gas lighting has passed." I do not hold that opinion. Indeed, I firmly believe that, not only on account of its relative cheapness, but also because of the inherent qualities of the light, gas still possesses a great field of usefulness, especially if the consumer is supplied with just the right type of burner. I would here register an emphatic protest against the action of certain authorities in prohibiting the use of gas in new houses constructed under the various housing schemes, as being grossly unfair and as wholly improper interference with

CHART SHOWING ANNUAL INCREASE OF GAS FIRES, RADIATORS, BOILERS, ETC.

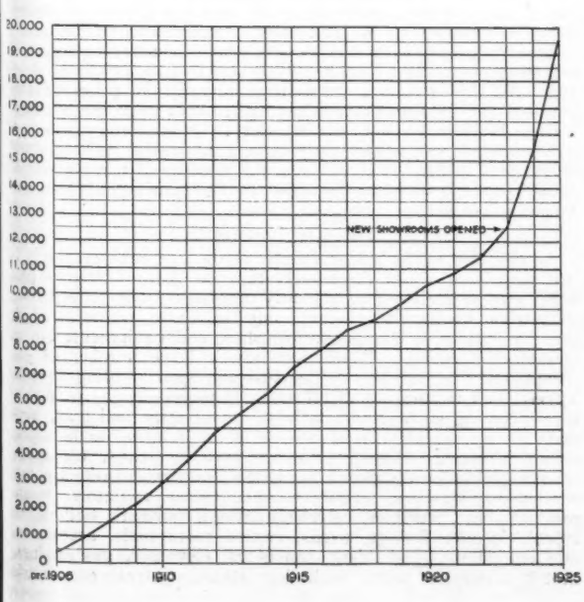
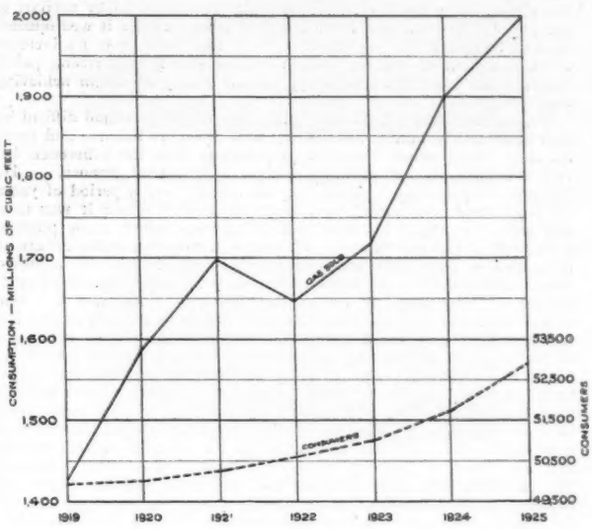


CHART SHOWING QUANTITY OF GAS SOLD PER ANNUM AND NUMBER OF CONSUMERS.



the undoubted liberty of choice on the part of the individual tenant. Such unfair competition can only be met by persistent publicity on the part of those responsible for the future welfare of the gas industry. Advocacy of the universal use of electricity seems to emanate principally from the adherents of what is called the Labour Policy, and can only be attributed to what I will call (for want of a better expression) a form of snobbishness, implying that up to the present electricity has been regarded as the rich man's light.

About three years ago, after a large number of experiments, a simple and cheap burner was evolved embodying a number of details of design which were considered essential to its reliability and efficiency. The burner was called the "British" burner, and has so proved its excellence that it has now been adopted more or less exactly by a large number of makers. Some two years ago, with their characteristic initiative, the Directors of the Company I have the honour to serve decided to supply to each prepayment consumer one of these burners, and in many cases a suitable pendant with attachment for a gas iron. Up to the present over 30,000 burners and 7500 pendants have been fixed; and I am confident that their policy has been amply justified. Cork slide and water-sealed pendants are now practically non-existent.

It is rather a sad reflection that until recently the makers of electrical apparatus have produced more artistic fittings than we have been able to obtain for gas, and I have on many occasions found it necessary to purchase electrical fittings and adapt them for the use of gas. It is, however, satisfactory to note that a marked improvement in the design of gasfittings has recently been evident. I also feel that full advantage has not been taken of the pneumatic switch, and am convinced that under 10 p.ct. of our consumers are even aware of the existence of such a useful appliance. It may be applied to almost any fitting without being unsightly, especially if the pneumatic tube is threaded through the supply pipe. By-pass pilot tubes, if fitted properly, need only consume a negligible quantity of gas.

I suggest that all gas salesmen should go through some course of technical instruction, and should be quite familiar with every one of the "Thousand-and-One Uses of Gas" for commercial, industrial, and domestic purposes; that they should also possess some definite knowledge of the features of our competitors' trade, and should thoroughly understand electrical units, terms commonly in use, and the general applications of electricity.

In conclusion, I should like to say with all modesty that, in my opinion, the gas industry owes an immense debt of gratitude to the British Commercial Gas Association for the good work it has accomplished in the past, and for its continued activities. But it must not be left to the Association and its capable officials to undertake all the work in connection with the promotion of the interests of the industry. We must each do a share in making the best use of our individual opportunities, and must apply that touch of personality which is, in all cases, necessary to meet our own particular requirements.

Discussion.

The PRESIDENT said the subject was interesting and topical. Mr. Copp had spoken at some length on the Electricity Bill. They all knew that the National Gas Council and the Institution of Gas Engineers had had the Bill very much in hand; and it was evident to most of them that the Bill as presented to Parliament would have been different if it had not been for the gas industry. Mr. Copp had mentioned that even the electrical industry was not enamoured of the objects of the Bill. One could be over-ridden with legislation; and he trusted the gas industry would never be encumbered

with such a Bill as this. Another point was the question of showrooms. He had been trying to get his Committee to go in for one; but they had turned it down for the time being, probably owing to the strike. The value of the showroom was indicated by a chart in the paper; there being a large influx of business after it was opened. It was further shown by another chart that there was an increase in consumption of gas per annum. This was a very strong point. Great credit was due to Mr. Copp for the ability shown in achieving such progress.

Mr. S. SHADBOLT (South Bank) said one of the principal difficulties that appeared to him in considering and trying to balance and focus all they heard about electrical propositions was the difference between municipal and ordinary company industrial finance. He thought the glib way in which capital spread over a period of years for repayment was quoted, and the rash way in which it was used and largely indulged in, were underlying facts which made possible some wild electricity dreams. Of course, the unreasonable nature of these dreams was only matched by the method that accompanied them. He quoted as an instance the supposed rejuvenation of agriculture in this land by means of electricity. He was not one to say that gas lighting was doomed; but he could not ignore the fact that electricity had a place, though not all the place. In regard to the attitude of housing authorities towards lighting, something would have to be done, as company undertakings had to meet municipal competition. They were finding cases where municipalities were their competitors by supplying the larger property owners with electricity in the district, because of the Ministry of Health not vetoing the extravagance, and assisting the councils by stipulating that one form of lighting must be installed on housing schemes. The National Gas Council should see that these opinions, biased to industry, were dealt with. As regards by-passes, he had found one of the biggest difficulties was the maintenance of the by-pass itself. One of the greatest troubles was its corrosion by the heat. It could be met by keeping the part outside the globe; but this was an unsightly alternative. He objected to the statement that competition was the best stimulus for the industry. A stimulant was a means of whipping-up flagging energies at their own vital expense. If they looked at it in that way, the industry did not need a stimulus. Competition might be termed an acceptable diet or a tonic.

Mr. C. S. SHAPLEY (Leeds) said Mr. Copp had done a lot in connection with the competition of gas and electricity, but he had not mentioned this. He congratulated Mr. Copp on work he had performed for his undertaking; and he could have told them a good deal more about services he had rendered to the consumers.

Mr. COPP, in closing the discussion, mentioned that the corroding of the by-pass by heat was simple to prevent. The by-pass should be kept as far away from the mantle as possible; and the flame should not reach too far outside the mantle, or the latter would lose its efficiency.

Mr. A. E. RUFFHEAD, Assoc.M.Inst.C.E., of Darlington, followed with a paper entitled "Graphs," which, together with the discussion, is held over till next week.

Mr. F. P. TARRATT (Newcastle) proposed a vote of thanks to Mr. Copp and Mr. Ruffhead for their papers. He said that at Darlington there was competition from an electrical power station which was equal to any in the country. Current was supplied at a cheaper rate than on Tyneside. Nothwithstanding this, the gas undertaking was constantly progressing. The rise in the price of gas while the speaker was at Darlington was due to an abnormal increase in the price of coal in 1899 or 1900, when it increased by 100 p.ct. It came so suddenly that the only thing that could be done was to raise the price of gas; but this was gradually reduced to the level figure of 2s. He congratulated Mr. Ruffhead on the success he had achieved.

Mr. C. G. BARRETT (West Hartlepool) seconded the resolution, which was carried; Mr. COPP and Mr. RUFFHEAD briefly replying.

OFFICERS.

The election of officers resulted as follows:

President.—Mr. Herbert Lees, Hexham.
Vice-President.—Mr. T. P. Ridley, Newcastle.
Committee.—Messrs. C. G. Barrett, West Hartlepool; C. F. Blincoe, Middlesbrough; and C. Turnbull, Alnwick.
Hon. Secretary and Treasurer.—Mr. Norman S. Cox, Sunderland.
Hon. Auditor.—Mr. C. H. Armstrong, Newcastle.

The retiring PRESIDENT then asked Mr. Lees to take the chair. The coming year, he said, would be the jubilee of the Association, and it was felt that they could not get a more worthy occupant of the chair than Mr. Lees, who had done a lot of work for the Association.

Mr. LEES said he was extremely grateful for the goodwill the members had shown in selecting him for the office of President. It was thirty years since he relinquished the office of President, and he had been a member of the Association for 38 years. There were still living many who were foundation members, but who were not actively associated with the work, though they took a keen interest in it. The work he had done for the Association had been a pleasure to him, and had gained him many friendships. He invited the Association to hold their next meeting at Hexham, if this was considered suitable. He expressed the hope that the trouble in the mining industry would soon be over, and that they would be on the high road to prosperity and comfort in the working of their undertakings. They were well provided in the district, and could maintain their supplies of gas for some time to come. There was a lot of talk about being economical; but he thought that people could save coal if they used more gas. It would be for the benefit of the community, and would help the gas companies.

It was decided to leave the date and time, as well as the place, for the next meeting of the Association in the hands of the Committee.

On the motion of Mr. C. F. BLINCOE, seconded by Mr. NORMAN READ (Gateshead), a vote of thanks was accorded the retiring officers for their services during the year.

Mr. ATLEY, the retiring President, briefly replied.

ECONOMIC UPKEEP OF GAS PLANT.

By C. W. BRETT, Managing Director, Barimar Ltd., Scientific Welding Engineers.

In the early days of welding, a far-seeing engineer gave utterance to the following prediction: "When the actual potentialities of welding are realized, and become more widely known, this unique process of metallic reconstruction will assuredly be adopted by all engineers and machinery users as the only rational method of mechanical repair." If that prophecy has not yet been fulfilled, it is rapidly approaching realization. To-day, throughout the world, those in charge of mechanical units rely more and more upon scientific welding to keep plant and equipment in commission, yielding maximum service.

There are several reasons for this universal recognition of the value of modern high-temperature treatment. It is, for example, rapid, economical, and efficient; it is adaptable to mechanical devices of all types and sizes, used for whatsoever process or purpose; and it is the only means whereby metallic attrition can be made good, fractured members or portions united, and weak parts built-up to any given dimension or strength. In other words, it is the sole process by means of which genuine mechanical restorations can be effected—because, of course, replacement, which is the only alternative, is not in reality a repair at all.

PROGRESS HINDERED AND ADOPTION DELAYED.

The earlier adoption of welding has been retarded, and much injury done to the prestige of the welder and the practice of welding, by first, the unqualified welding operator whose sole equipment for the work has been an acetylene generator, a "torch," and unlimited confidence; and secondly, insufficient publicity, with consequent failure on the part of those who should be interested to realize the economic value of welding as it applies to mechanical restorations and reconstructions of every description.

Every case in which serious damage has been done to costly units through the bungling efforts of the incompetent craftsman, every failure arising from the application of wrong methods, every foredoomed attempt unwarrantably undertaken and disastrously concluded, has been noted and unfavourably commented upon in the Press, and related, retailed, and whispered in technical circles where such reports could not fail to react, with a grave result on progress and development. This, of course, could have been counterbalanced by sound publicity dealing with the positive scientific achievements and actual engineering triumphs which stand to the credit of welding. As this was not done, the universal adoption of this rational and efficient process has had to wait upon the accumulation of irrefutable evidence relating to its economic value.

These dark and critical days have now passed, however, and if the present rate of increase in the number of users is maintained, there is no room for doubt that the early prediction will be fully justified.

THE GAS INDUSTRY.

Among the welder's best friends is the gas engineer; this is not surprising if one remembers that the gas industry is probably one of the most consistently progressive and enterprising industries in the world—not only in those matters which directly pertain to gas producing plant and equipment, but in collateral directions. There are now a large number of gas companies that rely almost exclusively upon welding for the upkeep and restoration of all units employed in gas manufacture. Among such repairs, arising out of wear and tear, fracture, or injury, may be mentioned those relating to boosters, rotary blowers, exhausters, steam turbines, fans, tar stills, charging machines, stokers, horizontal and vertical retort plant, condensers, washers, scrubbers, compressors, radiators, waste product plant, crucibles, retort mountings, purifiers, boilers (all types), furnace fittings, ovens, engine room tools, accessories and equipment, gasholders, conveyors, elevators, gas engines, motor transport units, including steam, petrol, or electric

wagons, lorries, trucks, yard locos, &c., frames, trusses, sleeves, gas mains, hoppers, sulphate plant, hydrogen plant, cisterns, and cylinders.

Among the inducements appealing to gas engineers who rely upon welding to make good all mechanical deficiencies is what may be described as its "applicability," or the readiness with which it can be employed on the spot without incurring the heavy expenditure contingent upon the dismantling of heavy machines or devices. Naturally, to those responsible for the upkeep of costly plant, this is a point of immense importance, especially when records show that, properly carried out, all reconstructions effected by high-temperature treatment are 100 p.ct. efficient.

Just a few words here in relation to the qualification "properly carried out." Three things are essential if a job is to be reconstructed or restored "equal to new:" (1) Qualified and competent operators; (2) the direction of an expert metallurgist who has specialized in the thermal treatment of industrial metals; (3) up-to-date equipment, comprising apparatus which will enable the job to be appropriately tackled by any of the half-dozen processes which are the welding specialist's stock-in-trade. The one-process man has not an earthly chance in the sphere of scientific metallic reconstructions, even though he possesses considerable skill in its application. The advent of modern alloy steels so restricted his effective activities as to put him out of the running in so far as the general upkeep of plant is concerned. High-speed steels containing varying percentages of molybdenum, zirconium, titanium, nickel, chromium, tungsten, cobalt, vanadium, and manganese are materials which, if they are to retain the special physical qualities which they were intended to embody, must be treated with profound respect. Anything in the nature of careless or ignorant handling during any stage of heat treatment can only result in extensive and possibly irreparable damage.

Laboratory Tests.

That good and bad welds are often externally indistinguishable is the incompetent welder's charter. He knows that superficial examination will not betray his inefficiency, and that when working tests reveal recurrent weakness and involve a breakdown, he can always lay the blame on faulty design, weakness of fabric, overloading, or "bad luck."

Scientific laboratory tests, including X-ray, radiometallographs, and microscopic examination, signify the instant detection of such faults as are due to inexpert application of any of the thermal or fusive agents. The defects most commonly observed are: Cold shuts, hard beads, oxidation, burning, flaws arising from improper preliminary thermal preparation, defects caused by contraction or expansion stresses, cracks, distortion, out-of-alignment, warping, &c. Any of these is sufficient to rob a whole unit of its efficiency, and to necessitate the purchase of a new unit. Cases are on record in which a badly-welded frame supporting a flywheel bearing has led to an accident involving thousands of pounds and almost total demolition of the engine house.

Efficient Welding.

Probably enough has been said to show that welding is in the strictest sense of the term an exceedingly scientific and highly technical process which, at every stage in its application, bristles with difficulties which can only be overcome by competent craftsmen, expert direction, and adequate equipment.

There is, however, the other side to the medal. Given these requisites, it is the one and only process of mechanical repair and metallic reconstruction which can properly be described as rapid, economic, and 100 p.ct. efficient. In most instances where welding has been employed in the restoration of a costly device, the actual cash saving may be put roughly at 50 p.ct. of the cost of replacement, though in a large number of cases the outlay has been merely a small fraction of the cost of a new device. Two examples may be given in support of this. One relates to extensive welding repairs on a badly-fractured marine engine. The work was carried on without dry-docking the ship or dismantling the engine, and was completed within five days. This restoration was subsequently passed "A1" by Lloyd's. Had welding not been employed, the ship would have been in dock about six months—with contingent loss of freight earnings—and a new triple-expansion set would have had to be purchased and installed. The other case has reference to serious damage to a hydraulic press. Not only was an enormous saving of time effected by a welding repair, but the saving from a financial point of view was equally gratifying. The job from first to last cost £390 less than the quotation for replacement.

Broken Cast-Iron Liner of 150 H.P. Gas Engine.

The fracture was caused by the crank-shaft breaking and the connecting rod hitting the liner.

The Gas Engine Liner Repaired by Scientific Welding.

The work was completed in a short time; the repair was guaranteed, and the cost small.

These examples are by no means exceptional; hundreds of similar instances could be given which any reputable firm of welding specialists could substantiate by documentary and other evidence. Nor is welding success claimable only on behalf of special devices or certain types of machinery. It can be used to rehabilitate all the ferrous metals and alloys, and most of the non-ferrous employed for industrial purposes. Nor is the size or condition of the job material. A forty-ton device is just as amenable to treatment as a light metal section, whether it be worn or fractured, old or new, damaged, or otherwise rendered unserviceable. All metallic reconstruction jobs are fish which come to the scientific welder's widespread net.

Rational Method of Maintenance.

After all, there is nothing surprising in the employment of high-temperature treatment in the repair or restoration of plant and machinery; it is perfectly natural to assume that that which has been fabricated by heat or produced by the use of thermal agents should be repairable by the application of heat—under, of course, proper control, and with due regard to the difficulties and dangers which attend welding operations. But it is unnecessary to attempt to prove the soundness of the theory of welding, when its practical and economic value has been established throughout the world, not merely by scientific tests, but by its high efficiency under super-load working conditions.

No such claims could be made on behalf of replacement—unless by "replacement" is meant the purchase of an entirely new machine. Replacement, for example, is a purely local remedy—that is to say, it cannot be applied to all worn parts of a machine simultaneously or during one overhaul. It is applicable only to certain components which have either actually given-out or manifest positive weakness, and does nothing to rehabilitate other members which, though still serviceable, are suffering from attrition or metallic wastage as the result of friction, and are steadily and inevitably going along the road which leads to breakdown.

There are other and obvious objections to replacement—notably the fact that it frequently involves the scrapping of parts which are potentially 100 p.ct. efficient—but it is unnecessary to labour the point in view of the fact that there already exists, as we have shown, a scientific method of mechanical repair and reconstruction—welding—which meets every requirement.

Wet Foul Main.

A paper describing some recent developments in the gas industry was presented at the last meeting of the Gas Section of the Wisconsin Utilities Association, by Mr. Louis Stein, Gas Engineer to the Northern States Power Company, of Minneapolis. Among other matters, he referred to accessories development on installations of gas ovens of the Improved Equipment Company's design. One which has been announced is a new development of an old practice—namely, what is known as the "wet foul main." It is said of this that the gas enters the foul main through a valved spray chamber. During the gas make the valve in the spray chamber is open, and gas enters the foul main through the spray. The sprayed liquor collects in the foul main, and is taken off at one end; and the gas is delivered from the foul main at the same or opposite end. By this arrangement, the gas is kept in contact with the liquor for some time before it goes into the dry main. When the oven or retort is to be opened, the valve in the spray chamber is closed; and this valve is of a special type, which allows liquor to pass through it, but traps the gas. The liquor spray continues to flow through the spray chamber, and collects in the foul main, just as when gas is flowing through the chamber with it. Sprays are placed horizontally in the foul main between the points of gas entrance, so that there is no danger of excessive fouling of the main by the collection of tar and pitch. All openings in the spray chamber are accessible for inspection, cleaning, &c.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Mediation, but not Subsidizing.

SIR,—I have read with great interest your leading article on the mining dispute this morning. I am, of course, writing this letter quite unofficially; but I feel that the whole position with regard to the coal industry is misunderstood by almost every writer in public journals and newspapers.

You say that "the Government have stood aside long enough to know that the affairs of the industry, and the estrangement between employers and employed, have drifted from bad to worse. Without intervention the same and worse dreary conditions will obtain." Ever since Government control during the war, and particularly since the Sankey Commission report (which brought about the Seven Hours Act, adding approximately 2s. per ton to the cost of production), there has been unrest in the industry, mainly because of political action. In my opinion, the owners' contention means that if the men's leaders realized that the Government would merely act as mediators, *and not grant subventions*, the wages question, along with others, would be very quickly settled. Everybody realizes to the full that the coal industry cannot pay the rate of wages as set forth in the 1924 agreement (see Coal Commission report). This is an incontrovertible fact; but so long as there is the possibility of receiving anything from the Public Exchequer to bolster-up uneconomic wages, so long will the men's leaders refuse to alter or depart from their slogan of "*not a penny off wages, or a minute on the day.*" This is only human nature.

The whole position to-day is a false one; and any third party should merely act as an unbiased mediator, and advise honestly and as strongly as possible the other parties, according to the facts and figures proved. The economic law of supply and demand rules the coal markets of the world, as it also does those of iron, steel, and suchlike industrial commodities; and it is an admitted fact that the cheaper the price of fuel, the better chance have other industries to prosper and improve the condition of the country generally.

Owing to the economic conditions of the coal trade at the time of the stoppage on May 1, the coal and coke markets of the world were very depressed; and prices were falling, and had been declining very considerably from the spring of last year. So much so, in fact, that serious concessions in price had to be given on renewals of gas coal contracts; and locomotive coal contracts from Jan. 1, 1926, were only renewed at reductions of 3s. to 4s. per ton.

I would like to point out that the future of the coal industry in the Commission's report was based on the prices realized in the last quarter of 1925, although prices were continuously declining, and a very much lower level of values would in the ordinary way have been reached in July next compared with last December. Owing to the advantage of bargaining being on the side of the buyer during the period mentioned, you will probably have noticed that serious reductions in price have been given to two sheltered industries—viz., gas and railways. A gas company has power to increase its price of gas; the railway company its rates, without any reference whatever to economic conditions. The colliery company must accept the best price it can obtain from the market.

I venture the opinion that sufficient attention has not been paid to the reduction of the cost of living. If the Government will do everything in its power to reduce the cost of living, wages and salaries could be reduced without placing additional burdens on the community.

While I am writing to you at such length, I feel I cannot close without saying that, in my opinion, all the talk about the re-organization of the coal industry is so much waste of time. To say "*that the present system of ownership and working in the coal industry stands condemned*" (*vide* Sankey report), in the light of the history of the industry, is inaccurate. I refer your readers to the splendidly equipped modern collieries costing millions; model colliery villages; welfare schemes; coking plants with bye-product and chemical works supplying gas to public undertakings, and fertilizers, dyes, motor spirit, and other chemical products to the world. Iron and steel interests have also to a great extent gone hand in hand with coal mining. Research in all matters connected with coal has occupied the constant attention of mining men for years. I wish, therefore, to give my little word of tribute to all the men who have through the ages built up a great national industry to its present importance. There has been a vast expenditure of both money and brains on the part of enterprising Englishmen; and these captains of industry are still prepared to carry on, *and only ask for the co-operation of the fine body of workers who have also done their share.*

In the Government's latest proposals, I wonder if it is clearly understood that every penny of profit would be forfeited by the colliery shareholder to the payment of wages. Nobody seems to consider that a colliery is owned not by one individual, but by thousands of shareholders; and the bulk of these shareholders are relying upon dividends *to keep them alive.* I plead for the industry to be allowed to conduct its own affairs; and I feel sure that, if a proper atmosphere is created, this can be done successfully from all points of view. But it must be realized that the sacrifices cannot be all from one side, and that economic laws will prevail.

May 27, 1926. CARBON.

REGISTER OF PATENTS.

Washing Coal, &c.—No. 250,291.

LAING, B., of Hatfield, and NIELSEN, H., of Muswell Hill, N. 10.

No. 28,468; Nov. 27, 1924.

According to this invention, the new carbonaceous material and impurities therein are subjected to a preliminary heat treatment, and thereafter the impurities are separated by the usual wet or dry methods. The invention is based upon the discovery that the pure material as a rule is affected far more strongly by the preliminary heat treatment than are the impurities. Consequently, by employing suitable temperatures ranging between 250° and 350° C., it is possible to obtain the pure material in a more or less porous state and consequently enlarged in volume, so that it becomes lighter in proportion to its bulk, while the impurities are not appreciably altered in bulk or specific gravity.

The raw material may be subjected to heat treatment in a suitable apparatus, for instance a retort of similar construction to that described in patent No. 212,961 [see "JOURNAL," Vol. 166, p. 405], so that any volatile matters evolved may be recovered in the form of oils, tars, and gases. However, the preliminary heat treatment can be carried out in any other suitable apparatus or manner. Furthermore, the heat treatment of caking or coking coals may, for instance, be carried on in such manner (*i.e.*, by omitting to add to the coke breeze or like inert substances which are usually added to prevent agglomeration) as to produce an agglomeration of the pure materials and the impurities; and the agglomerated mass may afterwards be crushed or ground to a coarser or finer grade before the actual separation of the impurities takes place.

The process does not aim at the reduction in quantity of the so-called permanent ash, which is more or less present in all coals; and the patentees are aware that it has been proposed to subject wet brown coal to a drying and heating operation and subsequently to a washing process in water to remove the ash-producing material. In the case of denser materials, the separation is effected in neutral salt solutions of 1 to 2 Bé.

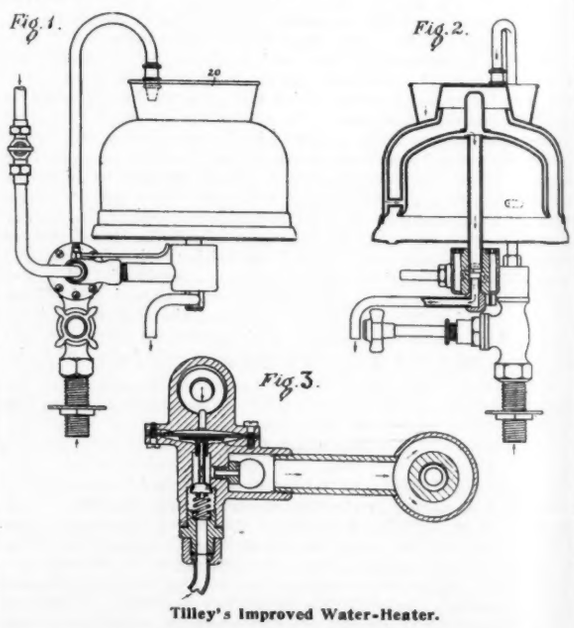
Water-Heater.—No. 250,406.

TILLEY, F. C., of Hendon, N.W. 4.

No. 11,771; May 6, 1925.

This invention relates to a water heater of the class in which the whole apparatus in combination with the gas burner is supported from the water pipe.

By employing the water cock as an upright pedestal, such a combined apparatus can be affixed to a lavatory basin, sink, &c., and connected up with the water supply pipe without its being necessary to employ a separate pipe for the purpose, as is now commonly the case. That is to say, one can simply take away one of the water taps of a lavatory basin or sink, and connect up the apparatus; the only addition being, in the case of gas, to connect up to the gas supply pipe.



Tilley's Improved Water-Heater.

The construction will be clearly understood from fig. 1, a side elevation; fig. 2, a sectional elevation; and fig. 3, a section on the line *a a* of fig. 1.

The detail claims are:

1. A geyser or like water heater comprising a water valve or cock acting as an upright pedestal and connectable to the water supply pipe and having a chamber positioned on the pedestal, a pipe from the chamber for supplying water to the geyser or heater, means carried by said chamber for heating a geyser or water heater, and a geyser or water heater carried by said heating means and heated therefrom.

2. A geyser or like water heater, as claimed in Claim 1, including a gas passage tube and burner connected to the chamber, and controlled by a valve actuated by a diaphragm acted upon by the water supply on the opening of the water cock, and a water heating vessel carried by the burner.

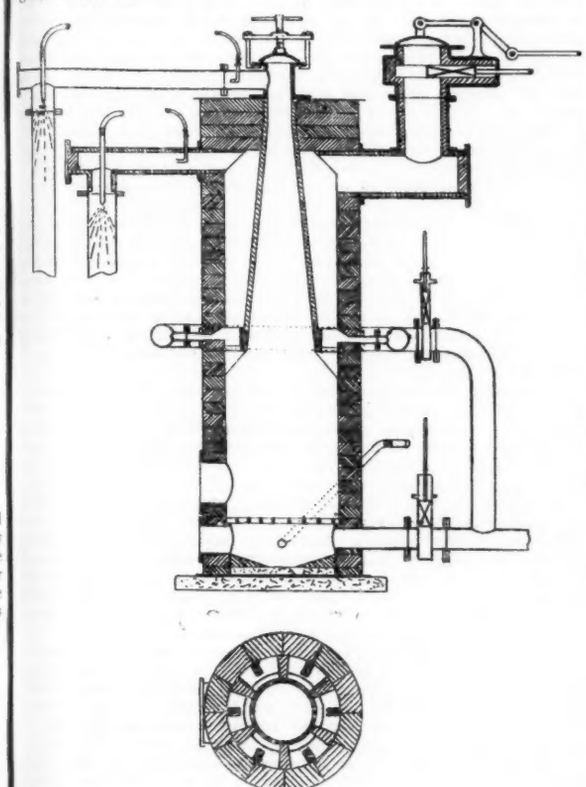
Gas Manufacture.—No. 250,626.

HELPS, G., of Nuneaton.

No. 27,373; Nov. 17, 1924.

The main objects of this invention are to manufacture gas of a comparatively low calorific value—and so, says the patentee, obtain the maximum efficiency—by a combined process of rich gas, water gas, semi-water gas, and producer gas manufacture.

Coal or other fuel is carbonized in the upper portion of a generator, preferably in an ordinary vertical retort separated from the sides of the generator, or in a modified form of a retort combined with a brick casing. The coal becomes coke in the usual way and then sinks down gradually to the producer directly under it, where it is treated as in an ordinary producer for making producer gas or blue water gas, as desired.



Helps' Mixed-Gas Plant.

The gas made in the lower portion of the generator may be caused to pass, in whole or part, up and around the retort, or pass through the retort in whole or part. Further, provision is made for burning part of either of the gases outside the retort. This process of burning, which is usually confined to the producer gas, may be intermittent or continuous, as desired. The burning is done by admitting air at suitable points at or near the lower portion of the retort; the products passing to the stack pipe. The effect is to increase the quality of the resultant mixed gas. It is also found that by passing producer or other gas round the retort without burning it, the sensible heat increases the rapidity of the gasification of the coal in the retort and at the same time increases the quality of the mixed gas produced. The gas so passed round the retort may be passed on to a waste-heat boiler, or to a holder for any desired use. Provision may be made for introducing gas to the upper portion of the retort independently of that made in the plant, which allows the plant to give an increased output, and increases the range both of production and quality.

The method of controlling the quantity of gas used around the retort is regulated by a damper valve. All the connections to the plant are fitted with steam jets and liquor sprays to keep them clear.

The patentee claims the following makes from 1 ton of Warwickshire steam coal: 190 therms of 165 B.Th.U. gas; 170 of 200 gas; 140 of 250 gas; or 130 therms of 300 gas.

We reproduce a vertical section of the complete plant and a sectional plan showing the flues outside the retort.

[As the result of a Provisional Report under Rule 29 of the Patents Rules, 1920, reference has been directed to five earlier patents granted.]

Discharging Doors for Retorts.—No. 250,716.

DEGENHARDT, W. R., of London Wall Buildings, E.C. 2.

No. 4968; Feb. 23, 1925.

This invention relates to apparatus for discharging the solid products from retorts, &c., particularly retorts for low-temperature distillation. Such apparatus comprises a discharge chamber into which the solid products from the retort pass, and the lower end of which is closed by a water-sealed door; the discharging chamber having an outlet shutter which is maintained closed until the products have become sufficiently cooled to be discharged.

According to the present invention, the water-sealed door is interrelated with the shutter in such a manner that the shutter commences to open only when the water-sealed door has moved clear of the lower end of the chamber, and is closed as the door approaches, but before it reaches, its sealing position. This is distinct from an arrangement heretofore proposed in which the shutter and the door move in synchronism, so that the shutter commences to open before the door moves clear of the lower end of the chamber, and is not closed until the door reaches the sealing position. The shutter in the present invention is preferably opened by one or more pins or projections serving, when the door moves clear of the lower end of the discharge chamber, to operate one or more arms connected directly or through gearing to the shutter.

Two forms of the invention are described and illustrated.

Purification of Gas.—No. 250,837.

COULIER, S., of Brussels.

No. 25,149; Oct. 8, 1925.

This invention relates to the purification of gases from sulphuretted hydrogen and hydrocyanic acid, which compounds are absorbed by an alkaline solution which may be regenerated and used again in the process. The object of the invention is a process in which not only the sulphur, but also the cyanogen, is directly recuperated as a product of value. Any alkaline solution may be employed, whether it contains an iron compound in suspension or whether this compound is made to act after the absorption of the H_2S and HCN. The process comprises a stage in which, after the separation of the iron sulphide, the solution containing alkaline ferrocyanide is treated with a compound of iron in the presence of carbon dioxide, or with a carbonated iron compound, in order to precipitate ferrous or ferric ferrocyanide, which is separated out before regenerating the alkaline liquor. Provision is made for the recuperation of the carbon dioxide in the process of regeneration of the resulting bicarbonated solution after the separation of the iron ferrocyanide, and the re-utilization of this carbon dioxide in the stage of precipitation of the iron ferrocyanide.

The gas, from which tar and ammonia have previously been removed, is admitted at the base of a column, in which, as it passes towards the top, it encounters a downward stream of purifying liquor—for example, a solution of sodium carbonate. The purifying liquor which passes out at the base of the column, after having absorbed the H_2S, HCN, and part of the CO_2 contained in the treated gas, is composed of NaHS, NaCN, and $NaHCO_3$, in an excess of neutral Na_2CO_3. For the purpose of transforming the sulphur and the cyanogen absorbed by the purifying liquor, the polluted solution is led into a mixer effecting an intimate contact with a compound of iron—for example, $Fe(OH)_3$—which is admitted into the mixer in a sufficient quantity to fix all the sulphur and cyanogen of the solution. The $Fe(OH)_3$ may be admitted in the form of an aqueous paste. The resulting solution, holding in suspension precipitated FeS and a slight excess of $Fe(OH)_3$, issues from the mixer and is led into a decanter. The decanted liquid flowing out of the decanter contains sodium ferrocyanide, sodium carbonate, and sodium bicarbonate, while the precipitated iron sulphide is expelled with the excess of reagent from the decanter in the form of a sludge. The solution of sodium ferrocyanide is directed into a mixer, which also receives a carbonated compound of iron. The liquid charged with the compound is led into a rotary washer. A current of carbon dioxide enters the washer, passes through it, and is placed therein in intimate contact in the liquid. The possible excess of carbon dioxide and the inert gases which may accompany it pass out of the washer. The carbon dioxide may be obtained from any source. The object of this treatment by carbon dioxide is to render soluble the compound of iron employed as reagent, and thus to bring it into the most favourable conditions under which it can react with the sodium ferrocyanide in the solution, in order to form ferrocyanide of iron. A further object of the carbon dioxide is to transform the sodium carbonate which may already exist in the solution, or which may be formed by the action of the carbonate of iron upon the sodium ferrocyanide, so as to prevent the action—which is, however, not very strong—of the sodium carbonate upon the ferric ferrocyanide. Moreover, as a consequence of this carbonation of the solution, the caustic soda which may be formed—if a part of the compound of iron acts as hydroxide—is immediately transformed into carbonate, so that there is no fear of the caustic soda decomposing the ferrocyanide of iron formed.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for May 5.]

Nos. 10,887-11,565.

BROPHY, M. M.—"Gas heating stoves." No. 11,005.
BUTLER, F.—"Gas cooking, &c., rings." No. 11,446.
CLENCH, C.—"Automatic gas-control apparatus." No. 11,219.
COOPER, R.—"Burners for gassing yarns, &c." No. 11,336.
DUDDY, D. E.—See Butler, F. No. 11,446.
FLAVEL, P. W.—"Gas burners for gas fires." No. 10,967.
HODGSON, J. L.—"Gas pressure-regulating valves." No. 11,503.
HOLYOAK, F. H.—"Geysers, &c." No. 11,427.
SMITH, W.—See Clench, C. No. 11,219.
STENNING, G. A.—"Geysers." No. 11,486.

MISCELLANEOUS NEWS.

MOSSLEY CORPORATION SPECIAL ORDER INQUIRY.

An application by the Mossley Corporation for a Special Order, under section 10 of the Gas Regulation Act, was the subject of an inquiry by Mr. J. F. Ronca (Director of Gas Administration) at the Mossley Town Hall, on Thursday, May 20.

Mr. V. C. Proctor (Town Clerk) appeared for the promoters; and there were also present Mr. William Bennett (Engineer and Manager) and Mr. W. Doig Gibb, Consulting Engineer to the Corporation. The opponents were the Saddleworth Urban District Council, represented by Mr. Vivian Joyce (their Clerk) and Mr. G. F. Bratby, owner of the land adjacent to the proposed new gas-works, and several cottage owners, represented by Mr. Heaton.

The Order contains provisions for the construction of new works, as well as for power to purchase land and borrow money. Saddleworth's representations to the Board of Trade were that the Mossley Gas Act, 1885, authorized Mossley to charge a differential price of 2d. per 1000 c.ft. in the urban district of Saddleworth. During the last forty years, the development of outside districts had been such that more than one-half of the total consumption of the gas produced by Mossley was consumed outside the borough. During this period a large sum had been contributed by consumers outside the borough in excess of payments by consumers within. Saddleworth understood that the contemplated capital on the new scheme would amount to £90,000; and by means of Saddleworth's preponderating consumption of gas at a higher rate, they would be compelled to contribute a greater proportion of the annual interest and sinking fund charges. The Council contended that, whatever justification there might have been for the differential rate in 1885, the position had now entirely changed. Extra capital cost might have been incurred originally to supply Saddleworth; but this had long since been met by the extra charges. Further, Saddleworth submitted that the present price of gas in Mossley was only possible owing to the large consumption outside the borough, and the consequential spreading of capital charges over a greater volume of production. Saddleworth asked that the differential rate should be discontinued, and the Order amended to give effect to this.

Mr. Proctor explained that in 1885 the Stalybridge and Mossley Corporation purchased the gas undertaking from the old Stalybridge Company. Mossley's area of supply was the whole of the borough of Mossley, the whole of the Saddleworth urban district, and some parts of the urban district of Springhead. Largely Springhead was supplied by the Oldham Corporation; and they consumed less than ½ p.ct. of the Mossley output. Springhead had no objection to the Order. For all practical purposes, the outside supply was in the Saddleworth area. In 1887, the first year the works were controlled by Mossley, of a total of 60 million c.ft. sold, 58 p.ct. was consumed in the borough. The total gas sold in 1925 was 221 million c.ft.; 45·7 p.ct. being consumed inside the borough. Mossley, with a population of 12,703, had an acreage of 3624; while Saddleworth, with a population of 12,600, covered 16,938 acres. Within recent years consumption had developed rapidly. Alterations from time to time had been imperative at the works; and in 1924, under a Special Order, additional land adjacent to the present site had been scheduled, in order to enlarge the present works. Dealing with the original project under the Order of 1924, to improve the works on the old site, the Town Clerk explained that the estimated cost was £40,792, of which £20,000 would be necessary expenditure to carry the old works on for the next five years. The larger scheme (the new works) was expected to be Government aided; and this scheme (already adopted by the Corporation), according to the soundest financial tests, would cost less per year to the consumers than the enlargement of the old works on the present site.

Mr. *W. Bennett* (Engineer and Manager) said that from 1887 to 1925 the gas sold and accounted for had increased by 267 p.ct. The present carbonizing plant consisted of nine beds of eight retorts; the capacity being 1,170,000 c.ft. a day when carbonizing screened coal, and 970,000 c.ft. on cheap slacks. The maximum day's output was 1,097,200 c.ft. The proposed new works would have a carbonizing capacity of 119 tons, producing, in modern settings, 1,600,000 c.ft. a day. The works would be provided with a private railway siding. It was estimated that the work would occupy two years from commencement to completion; and probably a cheap form of auxiliary plant would be erected on the present site, to supply the district's requirements. Including interest on loans and sinking fund charges, and comparing with the present costs, there would be an estimated loss of £2027 per annum without the Government unemployment grant. Assuming a grant of one-half of the interest on a loan of £80,000, there would be a net loss of £27 per annum on the present output. This scheme, better financially (with the Government grant) than the one contemplated under the 1924 Order, would be of immediate benefit to all consumers, and would also provide plant of greater capacity, in addition to the advantage of railway sidings direct into the works. Again, a far better lay-out of plant could be arranged than was possible on the existing site; and this would materially reduce labour costs and facilitate control over all operations.

Dealing with objections, Mr. Bennett stated that the cottage and shop property in question would be infinitely worse situated if Mossley erected works under their existing Order. The other objector, Mr. Bratby, was the owner of land on which was erected a commercial motor garage and repair shop. As such an owner, it did not appear that his consent was required before using lands which otherwise would be scheduled for gas-works purposes. The chief objectors, Saddleworth, contended that a very large aggregate sum had been contributed by consumers outside the borough in excess of the amount paid by consumers within. This was based on the assumption that a flat rate was charged to all consumers, which was not the case. The standard price in Mossley was 9·2d. per therm, and in the outside districts 9·6d. per therm. But these prices were not exacted. The charges in Mossley were 8d. per therm through ordinary meters, 7·2d. per therm through ordinary meters for trade purposes, and 9·2d. per therm to prepayment consumers. Outside the borough the charges were 8·4d. per therm through ordinary meters, 7·6d. for trade purposes, and 9·6d. to prepayment consumers. Rebates for gas for industrial purposes had, owing to varying circumstances, told heavily in favour of the outside districts. Since 1887 the gas sold in the borough had totalled 2,162,680,400 c.ft., and outside 2,170,813,000 c.ft. Since 1898 rebates for industry had operated; and in spite of the small differential rate, the average receipts per 1000 c.ft. had been no more for gas consumed outside the borough than within, and the consumers in the outside areas had not, in effect, paid for the additional cost of distribution. Since 1885 material and labour had increased enormously in cost, and, all the economic circumstances considered, a differential of more than 2d. could be shown as reasonable. It was alleged that the price of gas in Mossley to-day was due to an ever-growing consumption outside the borough, and the spreading of the capital charges over a greater volume of trade. The works originally purchased would have supplied Mossley's needs up-to-date, and for a long time ahead; but to meet the demands of outside areas an additional £58,330 was borrowed, and of this £21,498 was still owing. More than half the gas sold was certainly consumed outside the borough; but the outside districts were straggling, and the consumption per mile of main was much greater in Mossley. The greater part of Saddleworth's consumption took place 2½ miles from the works; and the distribution was thus difficult and expensive to maintain. Cost of the gas supplied to Saddleworth was drawn from the outlet of the holders and compressed by means of two rotary compressors to 5 lbs. per sq. in. The cost of compressing was equal to 0·367d. per therm in the outside areas. Altogether it cost 2·573d. per 1000 c.ft. more to supply the gas to the outside areas than to borough consumers. Thus, even if all gas in the outside areas bore a differential rate of 2d. per 1000 c.ft., there would still be a loss to the Gas Department on this supply, compared with the supply within the borough, of £256 per annum.

Mr. Bennett, in cross-examination, did not agree that with certain improvements the present gas-works would be adequate for the next fifteen years. The capital cost of the railway siding would be £3879, and the charges for joining-up to the main line £1980. The total cost of transportation of coal and coke and other materials for the year 1924-25 to and from the works was £2963. The character of the demand in the two areas was such that about 38 p.ct. of the total consumption in Saddleworth was for trade purposes, and 18 p.ct. prepayment meter consumers. In Mossley only 15 p.ct. was for trade purposes, and about 38 p.ct. for prepayment consumers. Questioned on a charge of 1s. 7d. per 1000 c.ft. made to a large consumer in the Saddleworth area, Mr. Bennett said this particular customer had a large suction gas plant; and he (Mr. Bennett) was out for business at the time. The customer wanted 22,000,000 c.ft. a year; and at 1s. 7d. he (Mr. Bennett) calculated he could manage to make a profit. They had lost 11 million c.ft. owing to the customer going over to electricity. Not only had they, by ordinary consumption, replaced this 11 millions, but they had increased another 6 or 7 millions. At the time this particular consumer was a useful man in keeping-up their output and reducing overhead costs. They were making 4d. per 1000 c.ft. on that extra production for the time being.

Mr. *W. Doig Gibb* handed to the Director a report he had prepared on the new gas-works. He stated that he was called in to give an opinion upon the scheme prepared by Mr. Bennett; and he approved of the scheme. He was quite convinced that this new scheme was a vast improvement upon any of the other schemes, and that the £100,000 spent upon new works would certainly ensure cheaper gas. He was of the opinion that the additional cost of distribution of gas in the Saddleworth area justified the differential rate.

Cross-examined, Mr. Doig Gibb said he was not convinced that a scheme of £100,000 was too ambitious. The Saddleworth district was a collection of hamlets and country districts, and there was no really big industrial area for a gas-works there. He thought the proposed site for the new works was the best.

Mr. Joyce, for the Saddleworth Urban District Council, said they were not there as obstructionists. They were just as anxious as the Corporation that the gas undertaking should carry on its work in the best possible manner, and that the consumers should have good gas at a reasonable price. The tendency had been for Parliament to abolish or reduce the differential after a period of years. For forty years the Corporation had had the advantage of the 2d. differential charge; and they estimated that about £20,000 had been contributed by the Saddleworth consumers since 1885 by reason of this differential. When Parliament fixed the differential rate, the yield to the Corporation was less than £200 per annum; to-day the figure reached about £1000 a year. There were many works compressing gas; and they did not for this reason charge a differential rate. The income from the undertaking had increased between 1914 and 1925 by £4940 in the borough, as against £7777 in Saddleworth. This was equal

to a 51 p.ct. increase in the borough and 73 p.ct. in Saddleworth. The price paid by the consumers of electricity in the Saddleworth area was the same as by consumers in the boroughs that formed the Electricity Board; so that there was no differential charge there. He called attention to three factors: (1) More than half the consumption of gas was accounted for in the Saddleworth area; (2) in spite of this the Corporation were entitled to apply, and had applied, surplus money to the relief of their own rates; and (3) there was no justification for the continuance of the differential charge. They also contended that the various Gas Acts should be consolidated. It was not the intention of the Council to call expert evidence at this stage. If it was necessary, that evidence would be produced.

Mr. HEATON, for the property owners, said their ground of complaint was that if the gas-works were erected this would depreciate the value of their premises, which now had an open view of the country, and had always commanded very good rents.

The Director then visited the gas-works, and made a tour of the area of supply.

PRIMITIVA GAS COMPANY OF BUENOS AIRES, LTD.

ANNUAL GENERAL MEETING.

The Twenty-Fifth Annual Ordinary General Meeting of the Company was held on Wednesday, May 26, at Winchester House, Old Broad Street, E.C.—Mr. P. A. COOPER (the Chairman) presiding.

The SECRETARY (Mr. Robert Grant) read the notice convening the meeting and the report of the Auditors; and the report of the Directors and the statement of accounts for the year ended Dec. 31 were taken as read.

The CHAIRMAN, on rising to move the adoption of the report and accounts, referred to the loss sustained by the Company through the death at the end of last year of Mr. J. M. Macmorran, who had been connected with the Company and its predecessor for over twenty years. At the last general meeting Mr. Frank H. Jones had been elected a Director; and immediately after that meeting Col. H. LeRoy-Lewis and himself had been elected to the Board. Mr. C. P. Ogilvie had resigned from the Chairmanship, but had decided to remain a Director. When he (Mr. Cooper) was invited by his colleagues to take the chair, he realized that a difficult task lay before him; but he saw clearly the fine business which the Company should have, and so decided to accept the invitation. The Chairmanship of the Local Committee had been accepted by Dr. Manuel Augusto Montes de Oca, who was well known in official circles, both in Buenos Aires and London; and Mr. Andrew Wilson had been appointed Deputy-Chairman in Buenos Aires. They welcomed these two gentlemen, who, with Mr. Bernard Browne (their technical member) and Mr. Stevenson (their General Manager), now formed the Local Committee. If the shareholders would look at the profit and loss account, they would see that the balance carried from revenue account was £17,000 better at £119,000; and the balance of profit carried to the balance-sheet was also £17,000 better at £56,000. On the balance-sheet the several debenture issues had been reduced by £41,000. The most important change on this side of the balance-sheet was in the item of "Sundry creditors," the London balance of which had risen by some £86,000. This was accounted for by £50,000 having been transferred to contingency reserve, and the amount owing on account of the installation of vertical retorts. The balance of £56,000 brought from profit and loss account added to the carry forward from 1924 totalled £95,000; and the whole of this sum had been carried to contingency reserve and depreciation and renewals account. It was by no means a strong balance-sheet; and so the Directors had decided upon the important step of devoting the whole of the balance of profit to strengthening the position. In the opinion of the Board, the shareholder must exercise some little patience. They had a fine business, which the Directors believed was capable of expansion; and this expansion should bring with it increased profits. Expansion, however, meant capital expenditure; and, therefore, as a preliminary step to raising further capital, they must set their balance-sheet in order.

THE YEAR'S OPERATIONS.

He did not propose to go into many details on the operating side of the undertaking; but they would be interested to know that in 1925 the Company sold 7·76 p.ct. more gas than in 1924. This increase would have been slightly greater, but for the higher calorific value of the gas produced, which had had the effect of reducing the amount of gas taken by each consumer. The Board, however, were of opinion that high-quality gas must be their first consideration; and, while there might be a temporary slowing-down in the increase in sales and profits, they were satisfied that this was the proper policy to follow, and that they would reap by it a better reward in the long run. They had agreed to take over the South Barracas Gas Company, which had been recently administered by this Company. The position was most unsatisfactory for both parties. The Board hoped to obtain a satisfactory concession, and thereafter to increase their business in this direction. The carbonizing results in 1925 were better than in 1924. The chemical works again made a satisfactory profit, which was shown at £46,000. If this were a separate business, the profit would be somewhat lower, as at present this section did not carry any share of the general overhead charges.

THE LABOUR POSITION.

Fearing that there might be a coal strike in the spring, the Directors laid in stocks of coal in excess of the usual supply, and were now comfortably situated. When it was possible, and they would do so without prejudicing the interests of the shareholders or customers, they would always purchase coal in this country; but to-day they must go abroad for their supplies. It was a thousand pities; but their business must go on. Since the recent disturbance in England, much had been written, and more said, about the strike and its effects. As this strike had a very direct effect on the Company's business in Buenos Aires, he hoped they would forgive him if he digressed for a moment. They must look into the future, and learn from the past such lessons as they could. The two outstanding essentials for the improvement of the industrial business in England were efficiency of operation and confidence between employers and their men. The two were inextricably bound-up together. It might be thought that, in the operation of their Company, efficiency in England was of no great consequence to them; but the contrary was the case, as the following instance would show. In England they bought coal in South Yorkshire, and shipped it from Hull. From time to time they had occasion to buy cargoes of American coal, which was mined in West Virginia, and carried by rail 400 miles to Baltimore. There was thus a big difference in rail haulage; but the point he would like them to notice was the time of loading. They shipped some 6000 tons on each boat; and the average time of loading at Hull was about 100 hours. On the other hand, in America, with the same size of boat, the average time was about 32 hours; and the last cargo (of 5000 tons) shipped was loaded in 7 hours. It was obvious that someone had to pay for these wasted hours of labour, trains, dock space, dock plant, and ships; and this was the biggest shipowning and coal-exporting country in the world. Now as to goodwill. One could not get efficiency without goodwill; and it did seem to him that much more must be done to get the goodwill and confidence of the men than had ever been done before. The initiative must come from the employer. There was no use in asking the men to give their confidence and goodwill unless they understood the problems. Those who studied these problems every day might understand them; but how could they expect the workmen to grasp the effect of exchange on prices, or the difference between nominal wages and real wages, or any of the other factors which affected their daily bread, unless they were taught. Enormous sums of money, and any amount of brains and energy, were expended by businesses in advertising—that was, in educating the customer, and gaining his confidence. Surely, it was only common sense to use a small proportion of this advertising and propaganda effort in educating and gaining the confidence of the workmen.

AS TO THE FUTURE.

Last summer he was in Buenos Aires, when he was appointed to the Board, and was able to bring back with him a considerable amount of useful information as to the scope of the business and its administration; and later Mr. Stevenson came over to see the Board in London. His (the Chairman's) report formed a basis for discussion; and, together with suggestions made by his colleagues from their technical and administrative experience, it has enabled the Board to lay down the general lines on which they consider the business could be best operated, and to adopt proposals which they believed would lead to improvement. Though much good work had been accomplished since the re-organization in 1923, much more remained to be done. He was leaving for Buenos Aires again immediately, in order to continue his examination of the Company's affairs, and to confer with the Local Committee and Management. Buenos Aires was a magnificent city of some 2¼ million people, and used less gas than any other great city. Though the population had increased since 1913, the sales of gas had been half what they were in that year. The war hit the Company very hard; and they were unquestionably suffering badly from its effects. But war or no war, this low consumption was most unsatisfactory, and must be remedied. They were, therefore, taking steps further to increase sales, and were looking forward to important developments in this direction. The first objective was to improve the service to the best of their ability; and to this end they were beginning to supply a better quality of gas. It was their intention to make the people of Buenos Aires realize, as was realized in other great cities, that gas was as much a modern household necessity as water. The development of a business such as theirs, as he had told them, called for large capital expenditure. Their working capital had gone; and, at present, the expenditure must come out of profits. Fortunately, the business was improving, and some surplus cash was available. In this connection, they had received material assistance from their bankers, who had confidence in the future of the business; and some of the large suppliers of plant and appliances, too, had supported them with extended credit. There had been placed before the debenture holders a scheme of consolidation of the "Buenos Aires (New)" and "River Plate" debenture stocks, and at the meetings he had stated that the Directors had before them a proposal to form an Equipment Company, through which they might finance certain extensions. When this matured, it would help them greatly. The staff in Buenos Aires were going through a very trying time; and he would like to record the Board's appreciation of the services of all the members of their organization. They had surmounted very grave difficulties, and had many more before them. Added to their continuous effort to improve and expand the

business, the Directors had, of necessity, made abnormally heavy demands upon them; and they had responded. This referred to Mr. Stevenson and the whole of his staff in Buenos Aires. In London, the Secretary (Mr. Grant) and his staff had been highly taxed. On behalf of the Board, and for himself, he would like to thank them one and all for the efforts they had made, and were making, on behalf of the shareholders. It should not be overlooked that a comparatively small expansion in business would give a relatively larger increase in profits. Thus the future held plenty of difficulties, but also plenty of possibilities.

Col. H. LEROY-LEWIS, C.B., C.M.G., D.S.O., in seconding the resolution, said that the peculiar position of the Company perhaps called for a few words from him, though he could add little to the Chairman's excellent address, every remark in which he cordially endorsed. He would, however, like to refer briefly to one sentence in it. This was with regard to the great business which the Company should have. There was no doubt whatever that they should have a great business; and there was also no shadow of doubt that they had not got one now. The Board asked the shareholders to exercise the great virtue of patience; and in return he thought the shareholders could expect the Directors to exercise another important quality, which was indefatigable industry. With these two things, he had little doubt that in a very short time the valuable concession they possessed in a highly important city would be made to yield fruits of which none of them need feel ashamed.

The CHAIRMAN, replying to questions, said the Board would not proceed with the raising of any further capital unless they felt that by doing so the interests of the existing shareholders were going to be materially forwarded. There was a sliding-scale in operation in Buenos Aires; but it was introduced some two years after the war.

The report and accounts were then unanimously adopted; and the appointment as Directors of Mr. P. A. Cooper and Col. H. LeRoy-Lewis was confirmed.

Mr. C. P. OGILVIE, moving the latter resolution, referred to the Glover-West vertical retort installation; remarking that good results were hoped for from it in the way of cheapened and larger gas production.

The retiring Director (Mr. Frank H. Jones) and the Auditors (Messrs. Geo. A. Touche & Co.) were re-appointed; and the proceedings closed with a vote of thanks to the Chairman and Directors, the Committee on the other side, and the staff both in London and Buenos Aires.

HONG KONG AND CHINA GAS COMPANY, LTD.

The Annual General Meeting was held at the Company's Offices, 148, Gresham House, Old Broad Street, E.C., on Friday, May 21—Mr. ROBERT H. GLEN, F.C.A. (Chairman), presiding.

The SECRETARY (Mr. A. C. Pullen) read the notice convening the meeting and the Auditors' report.

The CHAIRMAN: Gentlemen, copies of the report and statement of accounts having, by the strenuous efforts of the Secretary, been sent to all the shareholders, I will ask you to take them as read. We are late, on this occasion, in holding our annual meeting. The local audited accounts were dispatched from Hong Kong some weeks after the usual date; and, although special circumstances tended, we understand, to cause delay, representations are being made to the local Auditors on the matter.

You are no doubt fully aware of the troubles through which the Colony has been passing since June last. Business has, in consequence, been much restricted at Hong Kong, and many local firms have suffered severely. We are therefore fortunate in being able to show increases in our gas sales for the year at Hong Kong by 10,886,000 c.ft., and at Kowloon by 3,892,000 c.ft. For the first four months of 1926, gas sales at Hong Kong have progressed satisfactorily; but I regret Kowloon shows considerable diminution. Our works at Hong Kong are fully capable of coping with a large extension of gas manufacture. The water gas plant at Kowloon is in course of erection; and the Board feel that, in spite of the temporary setbacks, they can confidently expect the large outlay at Kowloon in recent years to be justified by results.

At our last general meeting, I mentioned that I was then about to leave for Hong Kong to deal with matters of importance; and I am pleased to report that an arrangement was made with the Hon. P. H. Holyoak, Chairman of the Hong Kong Chamber of Commerce, for him to accept the position of Chairman of our local Committee. I refer to two only of the other matters I then dealt with. A showroom in Des Voeux Road, near the Hong Kong Hotel, was settled upon, and was, in due course, opened, photographs of which are available in another room for your inspection. In connection with our local Committee and the Government Authorities, the question of acquiring a site at Kowloon for a new works, should such works be required in the future, was considered; and this matter is still engaging our attention. If your Directors decide to purchase land for this purpose, it will be necessary for the Company to raise fresh capital, in which case meetings of shareholders will be called, and the facts laid before them.

Reference is made in the report to the fact that our contract with the local Government for public lighting has been renewed to the year 1930. Every detail connected with public lighting has, both here in London and at Hong Kong, been under constant consideration; and we are well pleased that the Authorities, in renewing the agreement for five years, have shown their continued confidence in gas lighting and in our efforts to serve them with efficiency and by up-to-date methods. We fixed 180 new street lamps; and a considerable number are in the 1926 programme of extensions. During the year we sold outright, or supplied on loan, 1874 "Surbiton," "Esher," "Pyrol," and other lamps, &c., so you will see that private lighting continues to go ahead. We sold or fixed on loan 1805 cookers, grillers, geysers, &c.

I would now direct your attention to some points in our accounts. Land, works, and plant account shows an addition of £18,024; this being mostly for new mains, water g s plant at Kowloon, and waste-heat boilers.

In the revenue account, coal cost $223,694, as against $217,067. An additional 692 tons were carbonized; but I regret we cannot show a larger diminution in the cost per ton. Three-eighths of the coal used at Hong Kong Works was Yorkshire, and the results from it were very different from those we had been led to expect. We may succeed in finding a good coal, other than that we usually carbonize, which can be bought at a reasonable price, and which we can use, if the need should arise. The year 1926 will bring a considerable reduction in the cost per ton; and, although we are disappointed with the figures for 1925, if the cost per ton for the year be compared with cost per ton in 1920, a saving of £15,000 would be shown thereby. The strenuous efforts we have made during these years for economy will, of course, be continued.

The extra cost of carburetted water gas is explained by larger output. Working expenses were apparently less; but this is due to a re-allocation of wages to other accounts. Maintenance of works particularly is affected by this re-allocation.

The showroom account was $10,165. We had expected to sublet profitably a portion of the premises; but the boycott prevented this. The Hong Kong Hotel Company have now taken over the unoccupied part, and the showroom cost for 1926 will be lower. The debit for shop at Wanchai will cease, as it has now been dispensed with. The charges for bonus to staff and workmen, and for Provident Fund, are new; and I referred to these schemes at the last meeting. They will tend to better results, and to amicable feelings between employers and employed.

The debit for "Visits of Directors to Hong Kong" is in connection with Mr. Leonard Askew's and my visit to the Colony. Mr. Askew has recently returned from a visit to Hong Kong; and he has reported to the Board at length on various technical matters connected with the Company's business.

Gas rentals advanced from $483,565 to $513,906, an increase of $30,341; and the figures for residuals total $76,702, as compared with $68,922—this increase being due entirely to the extra coal carbonized. I think further comment is not needed on the accounts. The balance of net revenue amounts to £55,719 6s. 11d.; and a dividend for the year of 10 p.ct., free of income-tax, is recommended, less the interim dividend of 5 p.ct. paid in October last.

Before I sit down, I wish to say a few words about the conditions under which our Manager, Mr. Blackburn, and the local staff have worked since June last. We recently had an experience in London of strikes, fortunately only for a brief time; but nearly twelve months have passed since the boycott of Hong Kong commenced. The strain was greatest, of course, in the early days of the troubles; but the boycott of Hong Kong still goes on. I suggest to you that, under all the circumstances, we have done well to more than hold our own in business. I feel sure you will wish a special vote of thanks sent from this meeting to Mr. Blackburn and his assistants for their work during a trying period; and I shall propose a resolution to this effect.

With these remarks, I have pleasure in moving that the report and accounts be received and adopted.

Mr. STRACHAN C. CLARKE seconded the resolution.

Mr. H. KING-HILLER asked about the residual products, and pointed out that the return was about one-third of the expenditure on coal.

The CHAIRMAN replied that the Company laboured rather under difficulties on the residuals question, and that constant endeavours thereon had been and were being made.

The resolution was carried unanimously.

The CHAIRMAN then moved the following resolution:

> "That a dividend at the rate of 10 per cent. per annum, free of income-tax, be declared for the year ended the 31st of December, 1925, less interim dividend paid on the 1st of October, 1925, the warrants to be made payable on the 28th of May."

This was seconded by Mr. LEONARD ASKEW, and carried unanimously.

The CHAIRMAN proposed the re-election of Mr. Leonard Askew as a Director of the Company, and referred to Mr. Askew's visit to Hong Kong, stating that it was to the advantage of the Company for Directors to have an intimate knowledge of the Colony.

The motion was seconded by Major HERIOT R. GLEN, and carried unanimously.

In returning thanks, Mr. ASKEW said his visit was very interesting; and he thought it would be of use to the Board.

The CHAIRMAN then moved the following resolution:

> "That the proprietors of the Hong Kong and China Gas Company, Ltd., especially express their thanks to the Manager, Mr. Leslie James Blackburn, and the Company's local staff, for their services during the strike at Hong Kong and the prolonged boycott of the Colony."

He suggested that a shareholder should second it.

Mr. H. KING-HILLER said he had much pleasure in doing so.

After being supported by Mr. JOHN MCCUBBIN, the motion was unanimously carried.

The proceedings then terminated.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Act.

AMENDING ORDER.

Hampton Court Gas Company.

The Middlesex County Council having applied for an Amending Order revising the powers of charging authorized by the Hampton Court Gas (Charges) Order, 1921, the standard price which the Board propose to authorize in lieu of the existing standard price of 17d. per therm is 13·2d. per therm.

SPECIAL ORDERS.

Gloucester Gas Light Company.

For authority to raise additional capital, to increase the borrowing powers, to be relieved in certain circumstances from obligation to supply gas, for Directors under certain conditions to contract with the Company, to grant pensions, &c.

United District Gas Company.

The United District Gas Company of Adderbury, Banbury, seek authority to use specified land for gas storage, to create a capital redemption fund, and to increase the borrowing powers.

ELECTRICITY BILL.

Views of Prof. S. Parker Smith.

A doubtful view of the success of the scheme proposed under the new Electricity Bill was expressed by Prof. S. Parker Smith, D.Sc., of the Royal Technical College, Glasgow, in an address to the members of the Glasgow City Business Club at their luncheon on May 20.

Prof. Smith said that in all the conversations he had had throughout the country on this matter he had not found many enthusiasts. It was a fine idea to supply electric power at a cheap rate to districts which had no supply at present, and in the direction of decentralization of industry there was a lot to be said for a large electricity scheme; but how far was the Government justified in sinking capital towards furthering these ends? If they got their great Electricity Bill through, and were simply going to remain as they were, then the whole scheme fell.

They talked of using electricity in Glasgow, but gas was there first, and it was no use saying that gas was no good, because people were managing very well with it. They had to remember that where they were already supplied with cheap sources of fuel, such as coal and gas, the whole success of this electricity scheme depended on its being competitive.

The two largest supply authorities in the area were the Glasgow Corporation Electricity Department and the Clyde Valley Electrical Power Company. One of the things that would happen, doubtless, if this Bill went through would be that these two would link up; and very great benefit would result from that. They could have certain interworking arrangements with regard to coal, staffing, &c.; and by introducing these economies they would reduce the cost of electricity. This seemed to be one direction in which they ought to move; but if they linked up the East of Scotland with the West, he was afraid that the price would go up again. Cheap energy was needed principally in the Glasgow area, and it was not going to do any good to supply a lot of outlying places. If the Bill, when it became law, only gave permissive powers instead of giving the new Board compulsory powers, then the prosperity hoped for might be achieved.

Mr. J. Booth, of Edenfield, has been appointed Gas Examiner at Oswaldtwistle, to make 28 tests a year. His salary is £35 per annum.

CONTRACTS OPEN.

Superheaters and Light Controllers.

The County Borough of Dublin are inviting tenders for the supply of superheaters and automatic controllers. [See advert. on p. 477.]

General Stores (Manufacturing, Distribution, Lighting, &c.).

The Committee of the County Borough of Warrington are inviting tenders for the supply of various stores for a period of twelve months. [See advert. on p. 477.]

The Gas Department of the Borough of Stockton-on-Tees are inviting tenders for the supply of general stores, including pipes, meters, sulphuric acid, paint, &c. [See advert. on p. 477.]

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *May* 31.

There is no change to record in the position of pitch. There is little inquiry, and the price to-day is nominal.

Tar is stiffening slightly in price owing to short production.

Creosote continues in demand, and supplies are somewhat short. The price is firm at not below 7½d. per gallon net and naked at works.

Tar spirits are in demand and firmer. Pure benzole and pure toluole are 2s. 3d. to 2s. 4d. per gallon, and 95/160 solvent naphtha 2s. per gallon, naked at works.

Pyridine bases is steady at about 19s. per gallon.

Tar Products in the Provinces.

May 31.

Markets for tar products have remained steady throughout the past week, with little alteration in prices.

The coal strike may have a little effect on white products, and already there are signs of shortage of supplies.

The average values for gas-works products during the week were: Gas-works tar, 46s. to 51s. Pitch, East Coast, 67s. 6d. to 70s. f.o.b. West Coast—Manchester, 61s. to 63s. 6d.; Liverpool, 62s. 6d. to 65s.; Clyde, 67s. 6d. to 70s. 6d. Benzole, 90 p.ct. North, 1s. 8½d. to 1s. 9½d.; crude, 65 p.ct. at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8¼d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 11¼d. to 1s. 0¼d. Creosote, in bulk, North, liquid, 6¼d. to 6½d.; salty, 5⅞d. to 6d.; Scotland, 5⅞d. to 5⅞d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Singapore Gas Supply.—In his report to the President of the Singapore Municipal Commissioners on the working of the Gas Department for the year 1925, Mr. F. Bedford (the Gas Engineer) says a tar dehydration plant on the cascade system, supplied by Messrs. Clayton, Son, & Co., of Leeds, has been installed, and is working satisfactorily; and a "Columbus" pan breeze washer has been erected, and is giving excellent results. The coal used during the year was all Australian; but a trial is to be made with English coal. The quantity of gas manufactured, at 277,110,000 c.ft., showed an increase of 1·9 p.ct. over 1924. Of the make, 19¼ p.ct. was water gas. The number of consumers decreased by 318 during the year. Increased pressure to meet the needs of the growing cooking load has been maintained. The net profit, allowing for public lighting at cost, was $96,470.34.

A CHAMPIONSHIP TEAM.

This photograph has been received, from the Gas Light and Coke Company, by Messrs. Dennis Bros., Ltd., of Guildford. It represents the championship team of three 3½-ton Dennis lorries, which won the first prize and Challenge Cup against all comers at the recent Twentieth Annual London Parade of the Commercial Motor Users' Association, held in Lincoln's Inn Fields. These machines form part of a fleet of thirty Dennis vehicles belonging to the Gas Light and Coke Company.

COAL POSITION IN THE MIDLANDS.

From Our Local Correspondent.

Manufacturing industries are gradually succumbing to the creeping paralysis to which they are doomed by the stoppage in the coalfields. Pig-iron production has practically ceased in the Midlands. Some of the foundries are still working. They are able to get a certain amount of coke, but reinforcements of coal for annealing are not available. The forges are idle. The rolling of iron has come to a standstill. A few of the steel plants are in operation, some regularly, others intermittently. Manufacturers who have been able to carry on with gas and electric power and heat services are feeling the limitations of raw material. They are warned, moreover, of a tightening of the curtailment of gas and current.

The ordinance requiring industrialists to reduce by half their consumption of solid fuel in stock as well as of electricity and gas from public sources has not been strictly applied. It would be very difficult to apply it. The control is becoming more stringent, however. Some pithead stocks of coal which were being marketed on remunerative terms have been commandeered by the authorities.

Slack is still advertised for sale in the Birmingham area. Small bodies of miners are engaged in coal-getting in isolated cases. Outcrop coal which was gotten in previous times of famine is not being exploited on any appreciable scale now. Disturbances have occurred in some districts as a result of attempted working of those sources.

TRADE NOTES.

Cope's Feed Water Regulators.

A record month in the sale of Cope's feed water regulators has been experienced by Messrs. James Gordon & Co.; fifty sets having been ordered during May for super power stations.

Magnetic Ash Treating Plant.

The Fuel Recovery Syndicate, Ltd., of 40, Westminster Palace Gardens, S.W. 1, have obtained a contract from the Wandsworth, Wimbledon, and Epsom District Gas Company to instal a modern magnetic ash treating plant to take the place of their existing pan ash washing plant. The capacity of the magnetic plant, when complete, will be 8 to 9 tons per hour.

Woodall-Duckham Verticals for Deal.

The Directors of the Deal and Walmer Gas Company, acting under the advice of their Consulting Engineer (Mr. G. Anderson, of Messrs. Anderson Bros., 5, Victoria Street, Westminster, S.W.), have placed a contract with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for the supply of an installation of continuously working vertical retorts, having a carbonization capacity of 49 tons per day. The installation will be complete with the necessary coal and coke handling plant, coke storage hoppers and screen, and waste-heat boiler.

Bombay Pipeline.

In August, 1923, a large pipe track scheme was commenced connecting-up Bombay with the Tansa Lake. On Aug. 31, 1925, the President of the Bombay Corporation opened a valve which allowed water to pass through the new pipeline from Tansa Lake to Bombay. This marked the completion of the first stage of the project. Between August 16, 1923, and March 31, 1926, no less than 104 miles of steel pipes were manufactured and laid, leaving only a short length to complete the scheme. During this period there were three monsoons, which delayed the work, but which made the expedition of the two chief contractors—Messrs. Braithwaite & Co., Ltd., of 16, Broadway Buildings, Westminster, S.W. 1, and the Tata Construction Company—all the more creditable.

Cheaper Gas at Arbroath.—A highly satisfactory report on the operations of the Arbroath Gas-Works for the past year was submitted to the Gas Committee by Mr. A. C. Young (the Gas Manager); and in view of this it was agreed to make a reduction in the price of gas for the current year. The price for ordinary consumers was fixed at 3s. per 1000 c.ft., as compared with 3s. 2·7d. for the past year; and for slot meter consumers, at 3s. 4d. per 1000 c.ft., as compared with 3s. 6·3d.

Light and Fuel Shortage at Stocksbridge.—It is reported that Stocksbridge works have been closed owing to the lack of fuel, and 3000 men and 300 women have lost their work. Nearly another 1000 unemployed in the area are colliery and coke oven workers. It is a month since any fuel came into the district; and with the gas supply closed down and no electricity available, the position is becoming serious. The majority of people are having to exist on a ration of ½ cwt. of coal a week; and this is only possible at present because Messrs. Samuel Fox & Co. released some of the coal from their colliery, and placed it at the disposal of the Coal Authority. The Company still have a small reserve of coal, which is required for the maintenance of the colliery safety services.

Subterranean London.—On Saturday, May 22, some fifty members of the District Foremen's Association of the South Metropolitan Gas Company, accompanied by Mr. W. Reading (the Hon. Secretary) and Mr. W. R. Torry (Chief Inspector of the Company and Vice-President of the Association), paid a visit to the underground streets of the City of London, in connection with the question of mainlaying and distribution. The party were met at the entrance by Mr. W. J. Liberty (Hon. Secretary of the Institution of Public Lighting Engineers), who gave them a short history of these underground thoroughfares, and explained their utility and contents. He also gave a short talk on mainlaying and service distribution under the conditions they were witnessing, illustrated by a number of specially executed lantern slides. Mr. Torry, proposing a vote of thanks to Mr. Liberty, said it was extremely kind of him to give up a Saturday afternoon in this manner.

Price Temporarily Increased at Wallasey.—To meet the extra costs arising out of the industrial troubles, the price of gas to ordinary consumers in Wallasey (exclusive of slot meter users) is to be increased from 2s. 9d. to 3s. per 1000 c.ft. It is hoped that the increase will be only temporary.

No Bidding for a Gas-Works.—At Cleobury Mortimer, Messrs. Nock, Deighton, & Son offered for sale by auction the gas-works, Pinkham. There was no bidding; and it was announced by the Auctioneers that the works would be continued until the end of May, after which date they would be sold for scrapping.

Demonstration Houses.—The Leeds Corporation Gas Committee announce their intention of erecting an all-gas bungalow, at an estimated cost of £260—exclusive of fittings—on vacant land at the junction of Calverley Street and Portland Crescent, a central city site, for public demonstration purposes. The Electricity Committee propose to erect also, on the same site, a building for all-electric demonstrations.

Pelaw Main Collieries.—Among the latest public company registrations is the Pelaw Main Collieries, with a capital of £200,000 in £1 shares. The objects are to acquire and work certain collieries or coal mines at or near Birtley and Ouston, Durham, lately carried on by the trustees of the late Messrs. C. Perkins and W. E. Manners, under the styles of the Birtley Iron Company and the Pelaw Main Collieries Company, and to carry on the business of colliery owners and workers, and manufacturers of gas, bricks, coke, tiles, &c.

Gas-Works Seized for Tax.—A dispute between the Drogheda Corporation Gas Department and the Irish Free State Income-Tax Commissioners reached a climax some days ago, when Mr. John May (Income-Tax Collector), with a force of police (Civic Guards) and a fleet of lorries, prepared to distrain for the amount claimed—£700. Goods were being removed, amid some excitement, when the Town Clerk (Mr. Joseph Carr) gave an undertaking that the amount would be paid; and the Collector and his party retired. The Corporation's claim is that the amount involved should be audited by the Local Government Department's Inspector, payment being withheld pending that event.

Co-Partnership as a Remedy.—Mr. A. M. Paddon, whose belief in co-partnership is so well known to the gas industry, had the following letter in "The Times" on May 20: "It is, surely, not an inopportune moment to submit that, if the conditions precedent to the recent industrial disturbance are to continue unchanged, no immunity from similar consequences is to be expected. The principle of co-partnership, or co-operation in industry, has been effected on such a scale, and in so many instances, that a serious responsibility devolves upon those employers who will ignore, or affect to discredit, it. Those who have demonstrated its practicability and success are, I am assured, only too willing to supply what is lacking to those who are deterred by prospective difficulties, and to place their experience unreservedly at the disposal of all or any who are earnestly desirous of adopting this indispensable concomitant of industrial peace."

The entire destruction by fire on May 26 of the Town Hall at Cracow was said to be due to a short circuit.

The Bolton Gas Committee have considered a letter from the Amalgamated Engineering Union for an advance of 5s. a week in wages. The Gas Engineer reported on the matter, and it was decided to grant the increase.

Damage estimated at £25,000 has been caused by a fire at the Bargoed Colliery of the Powell Duffryn Company, which originated in the ignition of some naphthalene. The fire was confined to the chemical section of the colliery; and it is not thought it will materially affect the restarting of work in case of an early settlement of the coal dispute.

While electricians were working at the Bradford Royal Eye and Ear Hospital on May 12, two electric wires in wood casing under the matron's sitting-room floor fused, melted a lead gas pipe over which they passed crosswise, and ignited the gas, with the result that the floor caught fire. The fire brigade was summoned and some patients were removed from a ward. The fire, however, was soon extinguished.

At a meeting of the Nuneaton Town Council, on Wednesday last, it was reported that a letter had been received from the Board of Trade, in reply to a report submitted to them concerning certain proposals of the Nuneaton Gas Company, stating that no application had been received by them from the Company for permission to reduce the declared calorific value of the gas supplied by them, and that the Company were not required to apply for permission before effecting such a reduction.

The Halifax Gas Department, under the able management of Mr. W. B. McLusky, who has always a keen eye for business, have for many years been developing successfully their sale of gas and appliances for domestic cooking; but a new campaign has just been undertaken, in connection with which public demonstrations are being given to show the applicability of gas to water heating, grilling, and baking problems in the home, together with special exhibitions on how certain dishes can be cooked with simple utensils and a small gas stove.

Last week Mr. J. Bridge, Manager to the Elland-cum-Greetland Gas Company, secured an excellent public advertisement for gas by allowing a representative of a Halifax area newspaper to visit the works at Elland, to inspect the dismantled gasholder there, and to write a special article, in popular form, on the procedure of gas manufacture. The holder concerned is undergoing repair by Messrs. Robert Dempster & Sons, Ltd., of Elland. The water (filled in some 40 years ago) was pumped out of the tank by an old, but effective, fire engine, once in regular use by the Brighouse Corporation Fire Brigade, and which had been purchased specially for this job by Mr. Bridge.

STOCK MARKET REPORT.

THE coal deadlock continues to dominate the situation on the Stock Exchange. While prices generally are being maintained, fears of a prolonged stoppage and its inevitable effect on industry are causing investors to adopt a waiting policy. The success of the £2,250,000 issue of 6½ p.ct. preference shares in No. 2 D. B. Cotton Mills, Ltd., guaranteed by the Dunlop Company, which was over-subscribed ten times, shows, however, that there is plenty of money available. It is anticipated therefore that the £6,000,000 issue of New Zealand Government 5 p.ct. stock at 98½ will also be successful.

In the Industrial Market, a feature of the week was the strength of the electrical equipment shares. Textiles were quiet and eased off slightly; but Tobaccos maintained the improvement of the previous week. The prices of Bank shares show that the public have considerable confidence in them. For example, Lloyd's Bank "B" shares, which are limited to 5 p.ct. dividend, are being sold at 21s., and, leaving out of account the expenses of purchase, they yield only £4 15s. 3d. p.ct.

The Gas Market remained steady. Prices are low; but the combination of circumstances beyond the control of the companies account for this. First the drastic revisions of the standard prices by the Board of Trade, the selling of stock by nervous holders on account of the Government support of the electrical industry, and finally the coal dispute have all tended to depress the market. During the week the few quotation markings were, with one exception, in the upward direction. Alliance and Dublin ordinary stock advanced 3 points to 75—80, at which price it is still a high-yielding investment. Bristol max. rose 1½ points to 88½—89½; Montevideo 1 point to 74—77; and the three Sheffield stocks 1 point to 99—101. The exception was a fall of 3d., to 10s. 3d.—11s. 3d., in the Primitiva ordinary shares.

The statement of accounts received last week of the Cape Town and District Company reveals a satisfactory position, and their shares, if obtainable, would appear to be an attractive investment.

The following transactions were recorded during the week:

On Tuesday, Bournemouth "B" 12⅜, 12 7/16, British 100, Cape Town 4½ p.ct. debenture 71½, 72, Commercial 4 p.ct. 77½, 3½ p.ct. 76, European 5¼, Gas Light and Coke 80, 80¼, 80½, 4 p.ct. preference 76, Imperial Continental 126, 127, Primitiva 10s. 6d. 10s. 7½d., 10s. 10½d., 11s., 4 p.ct. (River Plate) debenture 67, South Metropolitan 92, 92¼, 92⅞, Southampton 4 p.ct. debenture 70½, Swansea 7 p.ct. preference 101. Supplementary prices, Brighton and Hove 5 p.ct. debenture 95, Leatherhead 5 p.ct. 7⅜.

On Wednesday, British 101, Commercial 4 p.ct. 77½, Continental Union 7 p.ct. preference 86, Croydon sliding-scale 97½, maximum dividend 80, Gas Light and Coke 80, 80¼, 80½, 3½ p.ct. 58½, 59½, Imperial Continental 126, 127, 127½, 127¾, 128, Primitiva 10s. 3d., 10s. 7½d., South Metropolitan 92¼, Swansea 7 p.ct. preference 102.

On Thursday, British 100, 102, Croydon sliding scale 98, European 5 5/16, Gas Light and Coke 79½, 80, 80¼, 80½, 80¾, 4 p.ct. preference 76, 76¾, 77½, Imperial Continental 127⅞, Montevideo 75½, 76, Primitiva 10s. 4½d., 10s. 6d., 10s. 9d., South Metropolitan 92½, 92⅛, South Suburban 98½. Supplementary prices, Barnet "D" 103½.

On Friday, British 99½, Commercial 4 p.ct. 78 5/16, 3½ p.ct. 76, Gas Light and Coke 80, 80¼, 80⅛, 80¾, 80½, 3½ p.ct. 58½, Imperial Continental 128, South Metropolitan 92½.

Credit in Lombard Street, as is usual at week ends, was plentiful. While tenders adhered to 4½ p.ct. for renewals, fresh money was forthcoming at 4 p.ct., and towards the close at 3½ p.ct. Treasury Bills were allotted at £4 6s. 10·28d. p.ct., nearly 8d. p.ct. higher than the previous week. On the result becoming known, some discount houses raised their rate by 1/16 to 4⅜ p.ct.

The French franc again dominated the situation on the Foreign Exchange Market. Further depreciation took place at the end of the week, influenced doubtless by renewed signs of the insecurity of the Government's position. After touching 152½, the rate closed at 150⅜. The Belgian rate moved in sympathy, and closed at 156⅜. Italian lire were steadier at 129½, after touching 130⅜. Sterling on New York was firm, the final quotation being 4.86 17/32.

Silver was maintained at 30 1/16d. per oz., and Gold remained nominally at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. May 28.	Rise or Fall on week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 4	5	5	Aldershot 5 p.c. max. C. .	74—77	..	..
222,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	69—74	..	..
1,551,868	,,	Apl. 1	6½	6½	Alliance & Dublin Ord. .	75—80	+3	..
374,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb. . .	60—65	..	..
300,000	1	May 6	1/7½	1/7½	Bombay, Ltd.	¾—1	..	..
170,000	10	Mar. 4	8½	8½	Bournemouth 5 p.c. . .	12—13	..	..
425,050	10	,,	7	7	Do. B 7 p.c. . .	12—12½	..	12⅜—12 7/16
275,000	10	,,	6	6	Do. Pref. 6 p.c. .	11—12	..	..
50,000	Stk.	Jan. 7	3	3	Do. 3 p.c. Deb. .	55—58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	75—78	..	..
214,740	,,	Mar. 18	12	12	Brighton & Hove Orig. . .	167—172	..	..
244,200	,,	,,	9	9	Do. A Ord. .	130—135	..	..
1,387,500	,,	Feb. 18	5	5	Bristol 5 p.c. max. . . .	88½—89½a	+1½	..
855,000	,,	Mar. 18	8	7	British Ord.	98—103	..	99½—102
100,000	,,	Jan. 7	7	7	Do. 7 p.c. Pref. . . .	117—122	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	69—74	..	..
100,000	10	Dec. 17	8	6	Cape Town, Ltd. . . .	6½—7⅜	..	..
100,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref. . .	5⅜—6⅜	..	..
150,000	Stk.	Jan. 7	4½	4½	Do. 4½ p.c. Deb. . .	68—73	..	71½—72
626,860	,,	Feb. 18	6	6	Cardiff Con. Ord. . . .	96—99	..	..
237,860	,,	Jan. 7	7½	7½	Do. 7½ p.c. Red. Deb. .	98—101	..	..
157,150	,,	Mar. 4	6	6½	Chester 5 p.c. Ord. . . .	87½—92½b	..	..
79,185	1	Apl. 22	†2/-	†2/-	Colombo Ltd. Ord. . . .	28/—30/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. .	20/—22/-	..	..
1,513,380	Stk.	Mar. 4	5½	5½	Commercial 4 p.c. Cap. .	77—82	..	77½—78 5/16
560,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap. .	76—81	..	76
475,000	,,	Dec. 17	3	3	Do 3 p.c. Deb. .	55—58	..	..
800,000	,,	Oct. 8	—	4	Continental Union, Ltd. .	32—37	..	..
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref. .	85—88	..	86
737,150	,,	Mar. 4	6½	6½	Croydon sliding scale . .	95—98	..	97½—98
403,100	,,	,,	5	5	Do. max. div. . . .	79—82	..	80
492,270	,,	Mar. 4	6	9	Derby Con.	107—109c	..	..
55,000	,,	Dec. 17	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Mar. 4	5	5	East Hull Ord. 5 p.c. . .	86—89	..	..
50,000	,,	Dec. 17	—	5	Eastbourne 5 p.c. Deb. .	93—98	..	..
1,002,180	10	Apl. 1	†6	†4	European, Ltd.	5—6	..	5½—5 5/8
18,788,960	Stk.	Feb. 18	5½	4/17/4	Gas Light & Coke 4 p.c. Ord.	80—82	..	79½—80½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	58—61	..	58½—59½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	75—78	..	76—77½
5,602,620	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb. .	57—60	..	..
181,315	,,	—	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	102—104	..	..
130,000	,,	—	10	10	Do. 10 p.c. Bonds. . .	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
82,500	,,	Mar. 18	6⅜	6⅜	Hastings & St L. 5 p.c. Conv	88—93	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	68—73	..	..
70,000	10	Sept. 24	†10	†10	Hongkong & China, Ltd. .	20—21	..	..
173,200	Stk.	Mar. 4	10	10	Hornsey Con. 3½ p.c. . .	66—68	..	..
1,976,000	,,	May 20	10	‡10	Imperial Continental Cap.	125—130*	..	126—128
226,170	,,	Feb. 4	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 18	6½	6½	Lea Bridge 5 p.c. Ord. . .	95—100	..	..
2,127,340	,,	Feb. 18	5½	5½	Liverpool 5 p.c. Ord. . .	79—80b	..	..
600,000	,,	Mar. 18	7	7	Do. 7 p.c. Red. Pref.	101½—103½b	..	..
165,736	,,	Feb. 18	9	8	Maidstone 5 p.c. Cap. . .	115—120	..	..
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb. . .	54—59	..	..
75,000	5	Dec. 3	†7	†6	Malta & Mediterranean .	4½—5	..	..
541,920	Stk.	May 20	†4	†6	Montevideo, Ltd. . . .	74—77*	+1	75½—76
2,061,315	,,	Mar. 4	5	5	Newcastle & Gateshead Con.	71½—72d	..	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref. .	75—76d	..	..
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb. .	69—71d	..	..
15,000	,,	Mar. 4	11½	11½	North Middlesex 10 p.c. .	155—160	..	..
91,530	,,	,,	8 5/16	8 5/16	Do. 7 p.c. .	112—117	..	..
300,000	Stk.	May 6	9	7	Oriental, Ltd.	95—100	..	..
188,120	,,	Jan. 7	7¼	7¼	Plym'th & Ston'house 5 p.c.	110—115	..	..
60,000	50	Mar. 4	14	14	Portsea Island B . . .	90—95	..	..
100,000	50	,,	13	13	Do. C . . .	88—93	..	..
2,289,909	1	—	—	—	Primitiva Ord.	10/3—11/3	—/3	10/3—11/-
282,200	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb. . .	84—86	..	..
600,000	Stk.	Jan. 21	4	4	Do. 4 p.c. Red. Deb. 1911	66—68	..	..
180,305	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	66—68	..	..
256,847	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	66—68	..	67
150,000	10	Mar. 18	6	6	San Paulo 6 p.c. Pref. . .	7⅛—8	..	..
125,000	50	Jan. 4	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 18	5½	6	Sheffield A	99—101e	+1	..
419,968	,,	,,	5½	6	Do. B	99—101e	+1	..
1,047,000	,,	,,	5½	6	Do. C	99—101e	+1	..
90,000	10	June 11	6	4	South African	5—7	..	..
5,609,895	Stk.	Mar. 4	5	7	South Met. Ord.	91—93	..	92—92⅝
1,895,445	,,	Jan. 7	3	3	Do. 3 p.c. Deb. . .	56—59	..	..
734,000	,,	Mar. 4	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	..
91,500	,,	Mar. 4	8½	8½	South Shields Con. . . .	117—119d	..	..
1,187,795	,,	Mar. 4	6½	6½	South Suburban Ord. 5 p.c.	98—101	..	98½
368,837	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	94-97	..	..
647,740	,,	Mar. 18	5	5	South'mpton Ord. 5 p.c.max	77—80	..	..
121,275	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	69—74	..	70½
250,000	,,	Mar. 4	7	7	Swansea 7 p.c. Red. Pref. .	99—102	..	101—102
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	..
120,000	,,	Feb. 18	7½	7½	Tottenham District A 5 p.c.	108—113	..	..
882,275	,,	,,	5½	5½	Do. B 3½ p.c.	88—91	..	..
150,000	,,	,,	28/4	5½	Do. 5½ p.c. Pref.	101—103	..	..
181,255	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74—77	..	..
258,251	,,	Mar. 18	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c. . . .	90—95	..	..
197,294	,,	Mar. 4	6⅝	6⅝	Do. 5 p.c. pref. .	85—90	..	..
88,330	,,	,,	5	5	Do. 5 p.c. Maidenh'd	87—92	..	..
91,800	,,	,,	6⅝	6⅝	Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Mar. 4	8½	8½	Wandsworth A 5 p.c. .	123—128	..	..
256,636	,,	,,	7	7	Do. B 3½ p.c. .	103—108	..	..
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	..
352,000	,,	,,	6⅝	6⅝	Wimbledon 5 p.c. . . .	97—102	..	..
98,000	,,	,,	7⅛	7⅛	Epsom 5 p.c.	105—110	..	..
88,416	,,	Jan. 7	3	3	3 p.c. Deb.	55—58	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. *Ex. div. † Paid free of income-tax. ‡Plus 8½ p.c. p.a. special dividend.

GASHOLDER AND TANK CONSTRUCTION AT THE SUTTON GAS-WORKS.

1,000,000 cubic feet capacity

By F. SOUTHWELL CRIPPS.

Price 10/6 net.

WALTER KING, LTD., "GAS JOURNAL" OFFICES, No. 11, Bolt Court, FLEET STREET, E.C. 4.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON TUESDAY, to ensure insertion in the following day's issue.

Orders to Alter or Stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Monday.

UNDISPLAYED ADVERTISEMENTS: Situations Wanted, Six Lines and under (about 36 words), 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum, 4s. 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

		ONE YEAR.	HALF-YEAR.	QUARTER.
United Kingdom & Ireland	Advance Rate:	35/-	18/-	10/-
	Credit Rate:	40/-	21/-	11/6
Dominions & Colonies & U.S.A Payable in Advance		35/-	—	—
Other Countries in the Postal Union. Payable in Advance		40/-	22/6	12/6

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Central 6055.

GAS PURIFICATION & CHEMICAL CO., LTD.,
PALMERSTON HOUSE, 34, OLD BROAD STREET, LONDON, E.C.2.

OXIDE OF IRON
FOR SALE OUTRIGHT, OR ON LOAN.

SPENT OXIDE
PURCHASED IN ANY DISTRICT.

Telegrams: "PURIFICATION, LONDON." *Telephone:* LONDON WALL, 9144.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

J. E. C. LORD (Manchester), Ltd.,
Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, &c.

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.,
99, LONDON ROAD, LEICESTER.
Telegrams: "BRIPURIMAT, LEICESTER." Telephone: LEICESTER 5096.
Solicit enquiries for:—
NATURAL BRITISH PURIFYING MATERIAL,
NATURAL HYDRATED OXIDE OF IRON,
FIRST QUALITY DUTCH BOG ORE,
BEST QUALITY BELGIAN BOG ORE,
"PREPARED" AND "UNPREPARED" ARTIFICIAL OXIDES.
SPENT OXIDE PURCHASED.
LONDON OFFICE: 34/35, NORFOLK STREET, STRAND, W.C. 2.
Telegrams: BRIPURIMAT ESTRAND LONDON." Telephone: CENTRAL 6361.

"LUX" PURIFYING MATERIAL
THE PREMIER MATERIAL FOR GAS PURIFICATION.

THOS. DUXBURY AND CO.
SOLE AGENTS FOR ENGLAND, SCOTLAND, IRELAND, WALES AND THE COLONIES (except CANADA).
16, DEANSGATE, MANCHESTER. *Telegrams* "Darwinian, Manchester." *Tel. Nos.:* 8368-9 City.
PALACE CHAMBERS, WESTMINSTER, S.W.1. *Telegrams:* "Darwinian, Par, London." *Tel. No.:* 6278 Victoria.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR (SATURATORS), LTD., Chemical Plant Engineers, Blackhorse Street Mills, BOLTON.
Telegrams—"SATURATORS, BOLTON." Telephone 848.

TO GAS ENGINEERS AND MANAGERS.
GASHOLDER PAINTING, &c.
FREE Estimates for the Cleaning and REPAINTING of Gasholders, Plant, Tank, Works, &c. All work personally Inspected, also Leakages attended to before Painting. First-class workmanship only. Highest recommendations. Lowest possible prices. All risks taken.
All communications to F. D. BUICK, Painting Contractor, 53, RAYMOND ROAD, UPTON PARK, E. 13.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815, Oldham, and 2412 Hop, London.
Telegrams—"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

NEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 243 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

SULPHURIC ACID.
SPECIALLY prepared for the manu-facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD., with which is amalgamated WM. PEARCE & SONS, LTD., 86, Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—ROYAL 1166.

WEIGHBRIDGES
FOR Motor Lorries and Railway Traffic can be seen erected at our works READY FOR DELIVERY. Inspection by your Engineer invited and a test by your Local Inspector of Weights and Measures before delivery. Every machine a High-Class Engineering Product and fully guaranteed.
CHARLES ROSS, LIMITED, SHEFFIELD.

GEORGE WILSON GAS METERS, Ltd. for GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS.
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER," and at 268, Stockport Road, MANCHESTER.
Telephone: RUSHOLME 976. Telegrams: "GASMETER," and 46 & 47, Auckland Street, LONDON, S.E. 11.
Telephone: HOP 647. Telegrams: "GASEOUS LAMB."

SULPHURIC ACID.
JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Burnley, are MAKERS of Special SULPHURIC ACID ("Eagle" Brand), for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

SPENCER'S Patent Inclined HURDLE GRIDS.
THE very best Patent Grids for Holding Oxide Lightly.
See Advertisement, April 14, p. 122.

PATENTS, Trade Marks, Inventions Advice, Handbook and Consultations free. KING'S PATENT AGENCY LTD., Director B. T. KING, C.I.M.E., Regd. Patent Agent, G.B., U.S., and Can., 146A, QUEEN VICTORIA ST., E.C. 4, and 6, QUALITY CT. (next Pat. Off.), LONDON, W.C. 40 years' refs. 'Phone Cent. 682.

HUTCHINSON BROTHERS, Ltd.,
FALCON WORKS, BARNSLEY.
MANUFACTURERS OF GAS METERS (Ordinary and Slot).
"FALCON" INVERTED LAMPS, SQUARE STREET LANTERNS, SUPERHEATER BURNERS, and CONVERSION SETS for Street Lanterns.

OXIDE OF IRON.
SPENT OXIDE BOUGHT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3. Phone: Royal 1484.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3. Phone: Royal 1484.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.
(*See "The Gas Salesman," p. 126*).
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3. Phone: Royal 1484.

ENQUIRIES SOLICITED.
FOR Gas Works Plant of Every Description; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.
C. & W. WALKER, LIMITED, DONNINGTON, NEWPORT, SALOP.

EDUCATIONAL.

LEEDS UNIVERSITY.
(DEPARTMENT OF COAL GAS AND FUEL INDUSTRIES.)
RESEARCH FELLOWSHIP.
APPLICATIONS are invited, up to June 19, for an OPEN FELLOWSHIP of £300 per Annum, established by the Institution of Gas Engineers for the prosecution of Post-Graduate Research in Gas Chemistry.
For further particulars apply to the REGISTRAR, THE UNIVERSITY, LEEDS.

LEEDS UNIVERSITY.
(DEPARTMENT OF COAL GAS AND FUEL INDUSTRIES.)
CORBET-WOODALL SCHOLARSHIP IN GAS ENGINEERING.
THE above-named Scholarship, of a value of £60 a Year, and tenable at the University for a period of Three Years with power of Extension for a Fourth Year, is offered for Competition by Candidates desiring to enter the University in October, 1926, as Students of Gas Engineering.
Candidates are required to submit their applications not later than June 19, to the REGISTRAR, THE UNIVERSITY, LEEDS, from whom full Particulars as to the Conditions of Award may be obtained.

APPOINTMENTS, &c., WANTED.

FIRST-CLASS Engineer, Salesman, and Representative. Wants Change. 20 years' Experience Gas, Chemical, Constructional. Used to big business.
Address No. 7660, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

ADVERTISER, who has had 25 years' Experience in the Design, Construction, Working, and Maintenance of all forms of Gas-Works Plant, and also Plant for the Recovery and Working-up of Residuals for Coke Oven Installations, desires Responsible and Progressive POSITION where such Experience would prove of value. Used to the Control of Men and to the Charge of a small Office Staff.
Address No. 7657, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

EXPERIENCED Lecturer and DemonSTRATOR in Cooking by Gas can give Local Demonstrations for Gas Undertakings.
Gas Engineers should apply now for vacant dates to Miss H. H. TUXFORD, M.C.A., "SOUTHBOURNE," BOTTESFORD, NOTTS.